17701

NATIONAL LIBRARY
OTTAWA

CANADA

BIBLIOTHÈQUE NATIONALE
OTTAWA

NAME OF AUTHOR SHERMAN J. STRYDE

TITLE OF THESIS The Development of an Instrument for Describing Dimensions of the Teaching-Learning Process

UNIVERSITY ~~Process~~ University of Alberta

DEGREE FOR WHICH THESIS WAS PRESENTED Ph. D.

YEAR THIS DEGREE GRANTED 1973

Permission is hereby granted to THE NATIONAL LIBRARY OF CANADA to microfilm this thesis and to lend or sell copies of the film.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

(Signed) Sherman J. Stryde

PERMANENT ADDRESS:

Lewisporte
Newfoundland

DATED June 22 1973

NL-91 (10-68)

THE UNIVERSITY OF ALBERTA

THE DEVELOPMENT OF AN INSTRUMENT FOR DESCRIBING DIMENSIONS OF THE TEACHING-LEARNING PROCESS

by

© SHERMAN JAMES STRYDE

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATIONAL ADMINISTRATION

EDMONTON, ALBERTA

FALL, 1973

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "The Development of an Instrument for Describing Dimensions of the Teaching-Learning Process" submitted by Sherman James Stryde in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

E. Miklos

Supervisor

D. Friesen

....

....

Robin H. Farquhar

External Examiner

Date June 20, 1973

ABSTRACT

The purposes of this study were: to conceptualize the teaching-learning process as it occurs at the classroom level of operation; to develop an instrument to measure the various dimensions of the process; and to use the instrument to determine what differences, if any, existed between teachers' perceptions of the process in different school situations.

The major process of the school was considered to be the teaching-learning process which is defined by the activities engaged in when a teacher teaches something to a student or group of students in a particular situation. The nature of the process is determined by a number of factors which manifest their influence in the manner in which activities of the process are characterized in terms of the locus of decisions regarding the activities, the degree to which the activities are programmed, and the extent to which the activities apply uniformly to students.

The instrument which was developed to measure the dimensions of the teaching-learning process took the form of a three-part questionnaire; each part was concerned with one of the characteristics of the process and the items focused on the activities which define the process.

The instrument was developed and analyzed in three stages. Based on the conceptual framework and drawing on

various sources for items, an initial draft was prepared and circulated to 28 people for reaction and comment. A revised draft was responded to by 99 teachers in nine schools. On the basis of factor analysis and item analysis this 90 item questionnaire was reduced to three scales of 18 items each. The final form of the questionnaire was responded to by 247 teachers in a stratified random sample of elementary, junior high, and senior high schools. The factor analysis of these data resulted in the identification of six subscales for each of the three scales.

The general findings from the analysis of data from the final administration of the questionnaire revealed that: in junior and senior high schools Mathematics-Science teachers as a group reported decisions regarding process activities to be further removed from the student than did teachers in Language-Social Studies and/or in the Practical Subjects on the total Locus of Decision scale and on all dimensions of the scale except one; on Change in Practice Over Time teachers in elementary schools reported more frequent change in practices than did teachers in junior and senior high schools on the total scale and on two of the six subscales; and on Uniformity of Practice teachers in elementary schools again reported practices to be more oriented to the student than did teachers in junior and senior high schools on the total scale and on five of the six subscales.

ACKNOWLEDGMENTS

The writer wishes to express sincere thanks to his advisor, Dr. E. Miklos, for his understanding, advice, and encouragement throughout the course of this study. Special thanks are extended to Dr. A. R. Hakstian for valuable advice and assistance given in the application of factor analysis procedures, and to Dr. N. Hersom and Dr. D. Friesen for helpful contributions as members of the thesis committee.

The assistance in computer programming provided by Mrs. C. Prokop and Mr. E. Skakun is gratefully acknowledged.

Sincere appreciation is expressed to the principals of the participating schools for their help and especially to the teachers who gave generously of their time and energy in responding and reacting to the various drafts of the questionnaire.

Finally, the writer wishes to acknowledge a great debt to his wife, Dona, for her constant encouragement and support, and to his children, Adela, Annette, Trevor, and Roma for their patience during the course of this endeavor.

TABLE OF CONTENTS

Chapter Page

1. INTRODUCTION 1

    THE STUDY 2

        Purpose 2

        Significance 3

        Statement of the Problem 5

        Definition of Terms 5

    ORGANIZATION OF THE THESIS 6

2. THEORETICAL BACKGROUND AND CONCEPTUAL FRAMEWORK 8

    A GENERAL MODEL OF ORGANIZATIONS 8

    ORGANIZATIONAL PROCESSES AND TECHNOLOGY . 11

        Organizational Processes 11

        Organizational Technology 12

    THE TEACHING-LEARNING PROCESS 18

        The Issue of Definition 18

        Activities of the Teaching-Learning Process 23

        Factors Determining the Nature of the Teaching-Learning Process 24

        Characterizing the Teaching-Learning Process 28

    CONCEPTUAL FRAMEWORK 30

3. DESIGN AND METHODOLOGY 33

    INSTRUMENT DEVELOPMENT PROCEDURES 34

Chapter Page

DATA COLLECTION 36

STATISTICAL PROCEDURES 38

Factor Analysis 39

Item Analysis 44

Analysis of Variance 44

Other Considerations with Respect to Validity and Reliability 45

DELIMITATIONS, ASSUMPTIONS, AND LIMITATIONS 47

Delimitations 47

Assumptions 48

Limitations 48

SUMMARY 48

4. INSTRUMENT DEVELOPMENT 50

THE INITIAL DRAFT OF THE QUESTIONNAIRE . . 50

Construction of the Initial Draft . . . 50

Reaction to the Initial Draft 53

Changes Made in the Initial Draft . . . 54

THE PILOT STUDY 55

Sample, Administration, and Scoring . . 56

Criteria for Item Selection 60

Analysis of Data for Part I--Who Makes Decisions 62

Subscales Proposed for Part I--Who Makes Decisions 68

Analysis of Data for Part II--Change in Practice Over Time 70

Subscales Proposed for Part II--Change in Practice Over Time 73

Chapter Page

Analysis of Data for Part III--Uniformity of Practice 77

Subscales Proposed for Part III--Uniformity of Practice 82

Other Changes in the Questionnaire . . . 83

SUMMARY 84

5. USE AND ANALYSIS OF THE FINAL FORM OF THE QUESTIONNAIRE 86

SAMPLE, ADMINISTRATION, AND SCORING . . . 86

ANALYSIS OF DATA FOR PART I--LOCUS OF DECISION 88

Factor Analysis 88

Reliability Estimates 95

ANALYSIS OF DATA FOR PART II--CHANGE IN PRACTICE OVER TIME 95

Factor Analysis 95

Reliability Estimates 102

ANALYSIS OF DATA FOR PART III--UNIFORMITY OF PRACTICE 102

Factor Analysis 102

Reliability Estimates 109

SUMMARY 111

6. THE TEACHING-LEARNING PROCESS AND SCHOOL VARIABLES 113

LOCUS OF DECISION 114

Type of School 114

Schools Within Each Type 117

Subject Area Specialization 120

CHANGE IN PRACTICE OVER TIME 130

Type of School 131

Chapter Page

Schools Within Each Type 135

Subject Area Specialization 135

UNIFORMITY OF PRACTICE 139

Type of School 139

Schools Within Each Type 144

Subject Area Specialization 146

SUMMARY 149

7. SUMMARY, CONCLUSIONS, AND IMPLICATIONS . . . 152

SUMMARY 152

Conceptual Framework 153

Design and Methodology 154

Instrument Development and Analysis . . 155

Findings Concerning Differences in Perceptions of the Teaching-Learning Process 156

CONCLUSIONS 159

Conclusions Related to the Conceptual Framework 159

Conclusions Related to the Instrument Developed 161

Propositions Suggested from the Exploratory Findings 162

IMPLICATIONS 164

Implications for Theory Development . . 164

Implications for Practice 166

Suggestions for Further Research 168

REFERENCES 170

APPENDIX A COPY OF THE QUESTIONNAIRE USED IN THE PILOT STUDY 176

Chapter Page

APPENDIX B COPY OF THE FINAL QUESTIONNAIRE 187

APPENDIX C OBLIQUE PRIMARY-FACTOR STRUCTURE MATRICES FOR EACH OF PARTS I, II, AND III IN THE USE OF THE FINAL FORM OF THE QUESTIONNAIRE 193

APPENDIX D ITEM INTERCORRELATION MATRICES FOR EACH OF PARTS I, II, AND III IN THE USE OF THE FINAL FORM OF THE QUESTIONNAIRE 197

LIST OF TABLES

Table Page

1. Categories of Process Activities, Representative Items, and Distribution of Items in Each Category 52
2. Distribution of Teachers in the Pilot Study by the Grade Level Taught 57
3. Distribution of Junior and Senior High School Teachers in the Pilot Study by Subject Area Specialization 58
4. Oblique Primary-Factor Pattern Matrix--Who Makes Decisions 64
5. Oblique Primary-Factor Structure Matrix--Who Makes Decisions 65
6. Item-Subscale and Item-Total Scale Correlations--Who Makes Decisions 67
7. Oblique Primary-Factor Pattern Matrix--Change in Practice Over Time 71
8. Oblique Primary-Factor Structure Matrix--Change in Practice Over Time 72
9. Item-Subscale and Item-Total Scale Correlations--Change in Practice Over Time . . 74
10. Oblique Primary-Factor Pattern Matrix--Uniformity of Practice 78
11. Oblique Primary-Factor Structure Matrix--Uniformity of Practice 79
12. Item-Subscale and Item-Total Scale Correlations--Uniformity of Practice 81
13. Distribution of Teachers by Type of School . 87
14. Distribution of Junior and Senior High School Teachers by Subject Area Specialization 89

Table Page

15. Oblique Primary-Factor Pattern Matrix--Locus of Decision 91

16. Subscales Proposed for Locus of Decision from the Pilot Study and from the Use of the Final Form of the Questionnaire . . 93

17. Item-Factor and Item-Total Scale Correlations--Locus of Decision 96

18. Oblique Primary-Factor Pattern Matrix--Change in Practice Over Time 98

19. Subscales Proposed for Change in Practice Over Time from the Pilot Study and from the Use of the Final Form of the Questionnaire 99

20. Item-Factor and Item-Total Scale Correlations--Change in Practice Over Time . . 103

21. Oblique Primary-Factor Pattern Matrix--Uniformity of Practice 105

22. Subscales Proposed for Uniformity of Practice from the Pilot Study and from the Use of the Final Form of the Questionnaire 106

23. Item-Factor and Item-Total Scale Correlations--Uniformity of Practice 110

24. Summary Information for Scales and Subscales of the Final Form of Descriptors of the Teaching-Learning Process 112

25. Analysis of Variance of Factor Scores on Locus of Decision for Teachers in Three Types of Schools 116

26. Analysis of Variance of Scores on Locus of Decision for Teachers in Six Elementary Schools 118

27. Analysis of Variance of Factor Scores on Locus of Decision for Teachers in Six Elementary Schools 119

Table Page

28. Analysis of Variance of Scores on Locus of Decision for Junior and Senior High School Teachers Classified by Subject Area Specialization 122

29. Analysis of Variance of Factor Scores on Locus of Decision for Junior and Senior High School Teachers Classified by Subject Area Specialization 123

30. Analysis of Variance of Scores on Locus of Decision for Junior High School Teachers Classified by Subject Area Specialization 125

31. Analysis of Variance of Factor Scores on Locus of Decision for Junior High School Teachers Classified by Subject Area Specialization 126

32. Analysis of Variance of Scores on Locus of Decision for Senior High School Teachers Classified by Subject Area Specialization 127

33. Analysis of Variance of Factor Scores on Locus of Decision for Senior High School Teachers Classified by Subject Area Specialization 129

34. Analysis of Variance of Scores on Change in Practice Over Time for Teachers in Three Types of Schools 132

35. Analysis of Variance of Factor Scores on Change in Practice Over Time for Teachers in Three Types of Schools 133

36. Analysis of Variance of Factor Scores on Change in Practice Over Time for Teachers in Three Senior High Schools 136

37. Analysis of Variance of Factor Scores on Change in Practice Over Time for Junior and Senior High School Teachers Classified by Subject Area Specialization 138

38. Analysis of Variance of Factor Scores on Change in Practice Over Time for Senior High School Teachers Classified by Subject Area Specialization 140

Table Page

39. Analysis of Variance of Scores on Uniformity of Practice for Teachers in Three Types of Schools 142

40. Analysis of Variance of Factor Scores on Uniformity of Practice for Teachers in Three Types of Schools 143

41. Analysis of Variance of Factor Scores on Uniformity of Practice for Teachers in Three Senior High Schools 145

42. Analysis of Variance of Factor Scores on Uniformity of Practice for Junior and Senior High School Teachers Classified by Subject Area Specialization 147

43. Analysis of Variance of Factor Scores on Uniformity of Practice for Junior High School Teachers Classified by Subject Area Specialization 148

44. Analysis of Variance of Factor Scores on Uniformity of Practice for Senior High School Teachers Classified by Subject Area Specialization 150

45. Summary of Findings for Dimensions of the Teaching-Learning Process in Different Type Schools, Different Schools of Each Type, and Different Subject Area Specializations 151

LIST OF FIGURES

Figure		Page
1.	General Model of Organizations	9
2.	Technology Variables	16
3.	A Conceptualization of the Teaching-Learning Process	31
4.	Stages of Data Collection	37

Chapter 1

INTRODUCTION

The study of formal organizations can be conducted from a number of perspectives. Hunt (1970) discusses five classifications of organizations each of which might form the basis for organizational analysis. Organizations can be studied in terms of their social functions--production, maintenance, adaptation, or management--which indicates the part played by the organization in the larger society. Secondly, organizations can be studied in terms of their form or structure. Studies of this type have distinguished between line organizations, functional organizations, and line-staff organizations; between "organic" and "mechanistic" organizations; or between bureaucratic and non-bureaucratic organizations. Thirdly, organizations can be studied on the basis of their output in terms of the type of output or product, or in terms of the quantity or volume of production. Fourthly, a classification can be made with respect to input--whether emphasis is on objects, people, machines, or something else. Finally, organizational processes can be used as the basis of study. One such process consists of the actions which are taken to transform inputs into outputs and has been variously labeled as primary process, primary production, technology, or throughput.

The position taken in this study is that the school can be viewed as a formal organization defined by Udy (1965:678) as "any group of persons plus the system of roles defining their interactions with one another." He also adds that such a group has specific and limited objectives. In attempting to achieve these objectives organizational personnel engage in a number of processes the major one being directly concerned with achieving the primary purpose for which the organization was established. The contention of this study is that, in the case of schools, this primary process is the teaching-learning process and, since it occurs mainly at the classroom level of operation, it is this level which should be the focus of attention.

THE STUDY

Purpose

Following the perspective just outlined, the purposes of this study were: (1) to propose a conceptual framework in terms of which the teaching-learning process might be analyzed; (2) to develop an instrument which might serve to describe and measure various dimensions of the teaching-learning process; and (3) to use the instrument in a limited, exploratory manner in order to determine what differences, if any, exist in various process variables in different school situations.

Significance

Maccia (1972:1) makes a distinction between description-oriented inquiry and prescription-oriented inquiry. Disciplined inquiry which functions to produce true descriptions is concerned with answering the question "What is?" and is referred to by Maccia as research. That which functions to produce sound prescriptions is concerned with "What should be?" and is referred to as development. Furthermore, description-oriented inquiry is a necessary prerequisite to sound prescription.

The need for description-oriented inquiry in education is noted by Lazarsfeld and Sieber (1964:33) who, while commenting on problems of educational research, observe that "most research in education is geared to the improvement rather than the understanding of education." Mauritz Johnson (1967) comments on the same issue with particular reference to curriculum development and reform noting a strong orientation toward action and results rather than inquiry. In a later paper Johnson (1969) commends the work of such researchers as Smith and Ennis (1961), Amidon and Flanders (1963), and Bellack and his associates (1966) who have sought to redress the balance by focusing on the "natural history" stage of educational research to provide insights into the nature of classroom operations.

The qualities of modern organizational theory which distinguish it from classical theory appear to be its conceptual-analytical base, its reliance on empirical research data, and its synthesizing, integrating nature all of which are based on the premise that the most meaningful way to study an organization is as a system (Scott and Mitchell, 1972:55). This whole orientation appears to give support for description-oriented inquiry in organizational research as in educational research generally.

This study was concerned with proposing a conceptualization of the teaching-learning process as the primary process of the school organization and with developing an instrument which might be used to describe the various dimensions conceptualized as being important. To the extent that this has been accomplished, a contribution has been made to furthering our understanding of a significant aspect of school organizations.

The development of an instrument which might serve to describe and measure dimensions of the teaching-learning process in terms of various characteristics could eventually contribute to the improvement of the activities engaged in. Such improvement might be possible through using the results of the application of the instrument in self-evaluation. Also, the instrument might be used in future research, especially where attention is being given to determining what relationships might exist between process variables and various measures of the quality of education provided.

Statement of the Problem

Three purposes were stated for this study. These are restated here as problems and sub-problems which served to give the study focus and direction:

1. To conceptualize the teaching-learning process as it occurs at the classroom level of operation;
2. To develop an instrument to measure those dimensions of the teaching-learning process conceptualized as being important;
3. To determine what differences, if any, exist between teachers' perceptions of dimensions of the teaching-learning process in:
    - 3.1. schools of different types;
    - 3.2. different schools within each type;
    - 3.3. different subject area specializations.

Definition of Terms

Certain terms were used in a rather specific sense in this study and are defined below.

Teaching-learning process. For purposes of this study, teaching-learning process is defined in terms of the conceptualization presented in Chapter 2. Briefly, it is the process in which a teacher teaches something to a student or group of students, usually in the class setting and involves activities at the preactive, interactive, and postactive phases of operation.

Teacher. The participant in the teaching-learning process who acts with the intention of influencing the cognitions, attitudes, or behaviors of students is the teacher. This study limits the use of the term to those engaged full-time in teaching as distinct from other school related activities such as counselling or administration.

Subject area specialization. A teacher is considered to specialize in the teaching of a particular subject or group of subjects if he spends more than half of his teaching time in that subject or subject area.

Type of school. School type is defined in terms of the grade level taught. Five different types were used at various stages in the study: (1) elementary schools--grades K - VI; (2) junior high schools--grades VII - IX; (3) elementary-junior high schools--grades K - IX; (4) senior high schools--grades X - XII; and (5) junior-senior high schools--grades VII - XII.

ORGANIZATION OF THE THESIS

The report of the study has been organized in seven chapters including this introduction.

In Chapter 2 literature from the fields of organization theory and education is discussed in terms of its relevance to the conceptual framework which is presented. Chapter 3 outlines the design and methodology employed and describes the general procedures and techniques used in developing the instrument and in gathering and analyzing data. The more detailed procedures followed in instrument development are described in Chapter 4. In Chapter 5 the use and analysis of the final form of the questionnaire are described and discussed. The findings regarding the differences in the teaching-learning process as perceived by teachers in different schools, different type schools, and different subject area specializations are presented and discussed in Chapter 6. In the final chapter the procedures and findings are summarized and conclusions and implications are formulated.

Chapter 2

THEORETICAL BACKGROUND AND CONCEPTUAL FRAMEWORK

This chapter reviews literature in the fields of organization theory and education to provide theoretical and conceptual formulations which are used to propose a conceptual framework for the teaching-learning process. A general model of organizations is presented within which to locate the process to be examined. Various treatments of the concept of organizational technology are examined to suggest a parallel with the teaching-learning process of the school at the classroom level of operation. Drawing on this background and on insights provided from literature in the field of education itself, the teaching-learning process is conceptualized in terms of the various sets of activities constituting the process, the factors which influence the nature of the process, and the manner in which it might be characterized.

A GENERAL MODEL OF ORGANIZATIONS

The growing body of knowledge concerning systems in general is presently receiving attention as a useful frame of reference for viewing many phenomena in a variety of fields. It appears to be appropriate for use in this study as a framework within which to locate the particular process which is the focus of attention.

Miklos (1970) has adapted conceptualizations and definitions from various sources which have resulted in the development of a model appropriate for the analysis of specific educational organizations at various levels. This model, consisting of the basic concepts of environment and suprasystem, boundary, input and output, components and structure, processes and subsystems, and feedback loop, is shown in Figure 1. Since most of the description of the model is adapted from Miklos (1970), separate acknowledgements will not be made for specific ideas.

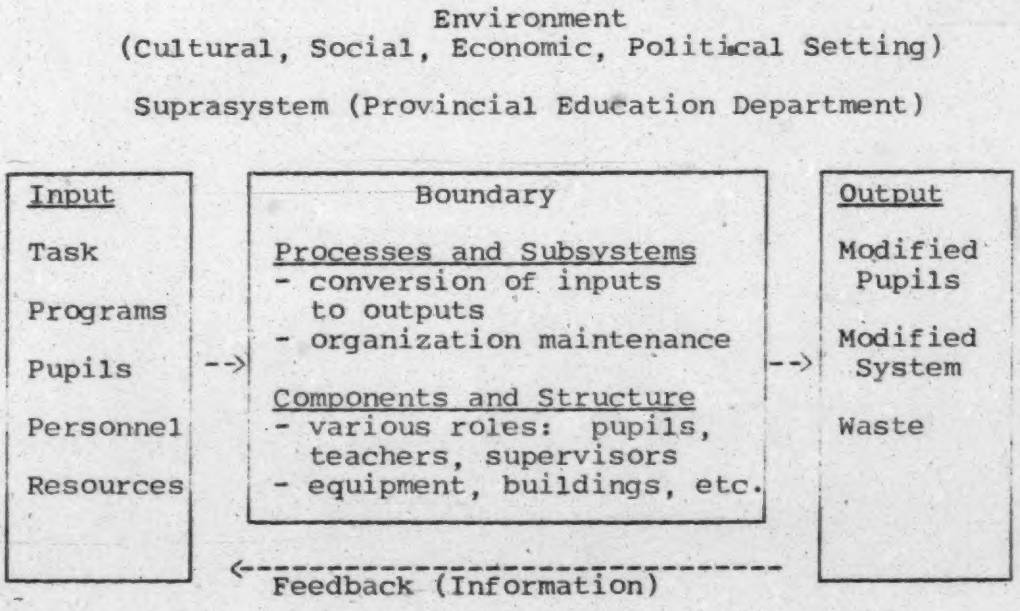

Environment
(Cultural, Social, Economic, Political Setting)
Suprasystem (Provincial Education Department)
Input
Task
Programs
Pupils
Personnel
Resources
Boundary
Processes and Subsystems
- conversion of inputs to outputs
- organization maintenance
Components and Structure
- various roles: pupils, teachers, supervisors
- equipment, buildings, etc.
Output
Modified Pupils
Modified System
Waste
Feedback (Information)

Figure 1

General Model of Organizations (Miklos, 1970:4)

The school as an organization can be viewed as an open, adaptive system. It is open in that it is dependent on other systems--it exists in an environment and engages in exchanges with that environment. It is adaptive in that a portion of the output becomes input which is used to regulate the system or cause it to adapt to new demands.

The system is separated from the environment by a boundary which merely distinguishes the elements that are to be considered as part of the system and those that are not. The inputs to the system from the environment consist of information in the form of statements of goals and objectives, values to guide the system functioning, specifications, preferences or suggestions as to how best to achieve the objectives; and matter/energy inputs in the form of human, material, and financial resources.

Within the boundary of the system a variety of activities are taking place which are related directly or indirectly to the conversion of inputs into outputs. All the related activities which are associated with the same category of system need constitute a process. Thus, a major process in the educational system is that consisting of teaching-learning activities. Another is the set of activities associated with maintenance of the system such as the recruitment and socialization of personnel. These sets of activities are generally performed by people but also involve the use of equipment, materials, and facilities. These human and non-human elements constitute the components of the system and those applied to the same process constitute a subsystem. The manner in which the components are ordered, the interrelationships among them, and the relatively enduring characteristics of the process define the structure of the system. The system as a whole has a particular structure and each subsystem within it also has a structure.

The outputs from the school as a system are primarily of two types. The pupils who enter the system as inputs are returned to the environment having been modified in cognitions, attitudes, and behaviors in varying degrees. Also, the system itself might be modified as a result of the processes taking place within it. In addition to these two major outputs there is also a measure of waste--resources which are used without having the intended effect.

The feedback loop indicates that evidence obtained from the nature of the output is fed back to influence the future operation of the system by modifying the inputs which in turn influence the internal processes.

ORGANIZATIONAL PROCESSES AND TECHNOLOGY

Organizational Processes

As shown in Figure 1, the two broad categories of organizational processes are those associated with the conversion of inputs into outputs and those which have to do with the maintenance of the system. These categories of processes include the more specific sets of organizational activities variously identified by organizational theorists including Bakke (1959), Katz and Kahn (1966), and Parsons (1960). Miklos (1970) presents a synthesis of these categorizations and suggests that the internal processes include: legitimation, external relations, goal definition processes; resource acquisition and distribution processes; supportive processes; adaptive processes; management processes; and primary production processes. The first five processes, either directly or indirectly, enable the system to engage in those activities which are the raison d'être of the organization--its primary production activities. Whatever the nature of the organization's output may be, whether material goods, symbolic goods, services, or something else, that set of activities directly concerned with achieving the primary purpose of the organization can be referred to as the primary production process.

Organizational Technology

The body of literature in the field of organization theory which relates most directly to the primary production process is that dealing with organizational technology. Although there has not been agreement on what constitutes an organization's technology, how it might best be conceptualized, or how to operationalize it, a discussion of some of the more notable contributions in this area is presented in order to establish a link with the process which is the concern of this study.

In attempting to deal at length with the technology variable used in the Aston studies, Hickson et al. (1969) note the varying meanings given to the term which, they suggest, has three facets. "Operations technology" is defined as "the techniques that [an organization] uses in its workflow activities" (Pugh et al., 1963:310), and has to do with the equipping and sequencing of workflow activities. "Materials technology" is a concept which concerns the characteristics of the raw materials used in the workflow. "Knowledge technology" is closely linked with materials technology but takes into account the characteristics of the knowledge used in the workflow--whether many exceptional cases are encountered in dealing with the raw materials and what procedures are used to deal with exceptions when they do occur. It can readily be seen that these three facets of technology are interrelated and, when compared with the various definitions used in the literature, many writers include all of them to varying degrees.

Whyte (1969) makes a distinction between technology and the workflow of an organization. Technology he uses to mean "the machines, processes, equipment, and supplies that are used in the work operation (Whyte, 1969:56). On the other hand, workflow is

> . . . the sequence of activities carried out in

> patterned form whereby the product moves from its earliest stages through to final completion or whereby a series of people perform independent tasks in the provision of a service to the customer (Whyte, 1969:56).

It can be concluded that it is in the workflow that an organization's technology is used. Even though the workflows of organizations are similar, their technologies may be quite different.

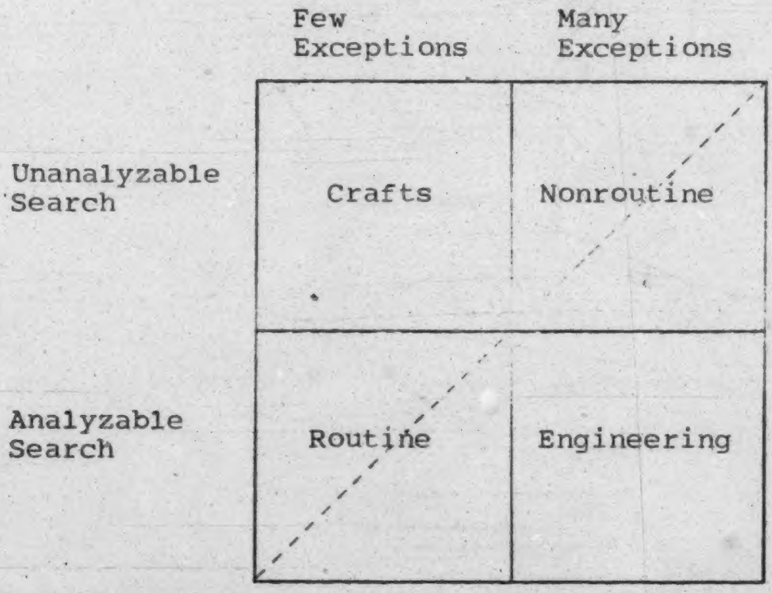
Such a distinction as that made by Whyte is not made by many other writers. Thompson and Bates (1957:325) defined technology as "those sets of man-machine activities which together produce a desired good or service," and Thompson (1967) later extended the concept to distinguish between long-linked, mediating, and intensive technologies. A long-linked technology is one involving serial interdependence in the sense that one act can only be performed after successful completion of the preceding act as is found most often in the assembly-line operations of mass-production, fabricating industries. Mediating technologies are found in organizations that provide a linking service between customers or clients such as in banks, insurance companies, or post offices. An organization using an intensive technology is characterized by the focusing of a wide variety of skills and specializations upon a single client as is the case in hospitals. All of these technologies describe something about the workflow operations.

The model adopted by Woodward (1965) is also a way of describing the workflow of the organization. She regarded her entire scheme of classifying organizational production systems as a direct index of technology which might be used as a scale of complexity ranging from unit and small-batch to mass to continuous process modes of production. In unit and small-batch production the focus is on custom manufacturing of single items or small groups of items. In mass production, as the name implies, a large volume of identical or very similar units is produced. Continuous process operations are characterized by the activities being constantly manned, and the worker being separated from physical contact with the product. Such an operation would be that employed in the processing of petroleum or chemicals.

One further conceptualization of technology which should be noted is that proposed by Perrow (1967, 1968). He defines technology as

> . . . a set of programmes to be put into effect when appropriate stimuli appear, and the strategies followed when new or unique stimuli appear, all for the purpose of changing raw material (human, symbolic or inanimate) into desired goods or services (Perrow, 1968:208).

Perrow's emphasis is on classifying or characterizing technologies in terms of a contingent two-dimensional model which distinguishes between routine and non-routine technologies. The first dimension has to do with exceptions--whether there are few or many in a given situation. In some cases almost every stimulus is a new one with no known rules for handling it. In other cases, the stimuli are almost always treated as identical. The second dimension of the model is concerned with the nature of the search procedures used when exceptions do occur. One type of search procedure might be to refer to some standard source such as a manual, or policy book, or some other routine or programmed source. This would be considered to be analyzable search. A second mode--unanalyzable search procedures--occurs when the worker is faced with a novel situation in which no standard search procedures are available so that he must rely on unanalyzed experience or intuition. In combination these two dimensions provide a four-celled model (Figure 2) in which the



	Few Exceptions	Many Exceptions
Unanalyzable Search	Crafts	Nonroutine
Analyzable Search	Routine	Engineering

Figure 2. Technology Variables (Perrow, 1970:78)

extreme routine position characterizes a situation where there are few exceptions and those that do occur have analyzable search procedures. On the non-routine extreme there are many exceptions and the search procedures are unanalyzable.

Perrow later refined this model to take account of the psychological processes involved (Hunt, 1970). From this point of view he presents a kind of cognitive conception of technology which works by a system of cues signalling the initiation of performance routines and involving provision for handling exceptions that may or may not be procedurally routinized. This feature of Perrow's conceptualization stresses that, regardless of how complicated or elaborate it is, a system may be viewed as technologically routine to the extent that the signals that initiate its processes are unambiguous; the performance processes so cued are programmed; and when faced with exceptions not covered by regular performance routines, search processes and problem-solving methods are programmed.

Taken together, the conceptualizations of technology which have been presented ascribe to it a number of characteristics. Technology has to do with activity intended to produce change in something; it involves the use of processes, people, and tools; it includes the sequencing of activities; it takes account of the nature of the raw material; it operates on certain assumptions about the knowledge of cause/effect relationships in working with raw material; it has a cognitive aspect which operates as a system of cues signalling the type of performance routines to be engaged in by the individual performing the activities; and it might be variously characterized in terms of the degree of routineness, complexity, diversity, or predictability of outcome. Although most of the conceptualizations discussed do not include all of these characteristics, together they suggest that, as discussed in much of the literature, organizational technology may be a useful way of examining the primary production process.

THE TEACHING-LEARNING PROCESS

The Issue of Definition

One difficulty in discussing the school's equivalent to the primary production process is the lack of a consistently clear distinction in the use of much educational terminology. Macdonald (1965:2) has observed that

> One definition of _curriculum_ may well turn out to be the same as the next definition of _instruction_, and this definition of _instruction_ could quite likely be synonymous with another's definition of _teaching_.

Macdonald makes a distinction among these terms by using the concept of system as a referent. The teacher is a personality system with needs, predispositions, past experiences, and unique values. "The professionally oriented behavior of the individual system, called teacher by society, makes up the acts of teaching" (Macdonald, 1965:3). Similarly, students are individual personality systems and the actions that students perform which teachers perceive to be task related are learning behaviors. Learning, like teaching, is primarily system oriented and only secondarily related to teaching. Macdonald considers the instructional system to be the teaching-learning system--a social system usually bounded by a classroom with a teacher, a group of students, materials, and social norms. This system is the action context within which formal teaching and learning take place.

Johnson (1967, 1969) does not provide a definition of teaching or of instruction but does describe some of the characteristics of instruction and the components of an instructional system. He also contends that whether teaching is a sub-set of instruction or vice-versa depends on whether the frame of reference is the entire professional role of teachers or their role in particular interactions. The instructional system has three components: planning, execution, and evaluation. The actual instruction takes place at the execution stage and, according to Johnson, is characterized by the two concepts of influence and interaction. Although the influence in instruction is not uni-directional, "the net effect is predominantly in one direction and the intention to influence is almost entirely so" (Johnson, 1969:125). Johnson further adds that the two functions of teachers which are essential to instruction are display and control. A cognitive knowledge outcome of instruction requires that data be displayed in some form which might range from "teacher talk" or lecture to typewriter output or a cathode ray tube in computer-assisted instruction. The control function is concerned with controlling the interaction between teacher, student, and the display.

A number of writers specifically treat instruction as a sub-set of teaching. Smith (1963) contends that teaching is a broader term than instruction and includes a number of components such as: techniques of classroom control, ways of involving students in exercises and activities, instructional procedures, and methods of evaluation. Viewing teaching from a more philosophical perspective, Green (1965) also considers teaching to be a molecular concept which, as an activity, "can best be understood not as a single activity, but as a whole family of activities within which some members appear to be of more significance than others" (Green, 1965:286). Within this family of activities Green includes conditioning, training, instructing, and indoctrinating but argues that "the most central properties of the concept of teaching are revealed . . . within the limits of what we have called the region of intelligence" (Green, 1965:293). In short, teaching has to do primarily with the relation between thought and action which explains why conditioning and indoctrinating are considered to be of less significance as teaching activities than training and instructing.

Philip Jackson (1966), too, has observed that teachers engage in many activities besides those involving instructional interchanges with students. He has introduced the terms interactive teaching and preactive teaching to distinguish those activities which occur vis-à-vis the students from those which occur in preparation for such interactions. Aoki (1971) has added a third phase to the teaching process--the postactive phase. As these terms are used by Aoki, the preactive phase is the phase of instructional planning during which the three components of intended outcomes, instructional content, and teaching strategies and their relationships are developed. In the interactive phase the teacher performs being guided by three concurrent processes: the student-student and teacher-student social interaction; the two-way control influences between teacher and students; and the transaction between the student and the environmental display. The postactive phase of teaching is primarily concerned with evaluation of outcomes and the implications for modification in the other two phases. In many ways, these three phases of teaching correspond to the planning, execution, and evaluation components in the instructional system proposed by Johnson (1967).

Taking account of the definitional issues just discussed, it might be argued that the primary production process of the school is the teaching process as it is broadly defined. However, as the term has generally been used, the teaching process appears to be a uni-directional process and its use as the school's primary production process might leave the implication that the primary purpose of the organization can be achieved by the activities of teachers without regard for the active involvement of students. Therefore, in this study, the primary process of the school is taken to be the teaching-learning process which is broadly defined by Maccia (1972:6) as "one in which someone teaches something to someone somewhere." Such a definition encompasses teacher, curriculum, learner, and setting and the interactions of all of these. Furthermore, it will be accepted that the teaching-learning process consists of a preactive phase, an interactive phase, and a postactive phase as these are defined by Aoki (1971). The extent to which the learner is involved in the activities defining the teaching-learning process depends, not so much on the nature of the activities themselves, as on who makes decisions with respect to these activities and the manner in which various persons are involved in the activities.

Activities of the Teaching-Learning Process

It was noted earlier that an organizational process is made up of those related activities which are associated with the same category of system needs. Therefore, the teaching-learning process can be defined in terms of the activities of which it is constituted. Gibbons (1970) has proposed a model for the study of individualization in schools and includes in it various elements of instruction which appear to encompass the activities at the preactive, interactive, and postactive phases of the teaching-learning process. An adaptation of part of the Gibbons' model is presented here to suggest that the activities of the teaching-learning process include those related to: defining instructional objectives; selecting and using instructional resources including programmed and nonprogrammed materials, A-V equipment, adults in addition to the teacher, time, and space; grouping of students; workflow sequencing; methods and activities of instruction; evaluation; and student control.

It is recognized that there might be a considerable degree of overlap in the categories of activities suggested and that they may not occur independently. Also, whether a particular activity occurs consistently at the preactive, interactive, or postactive phase is not always determined by the nature of the activity but might vary with the situation.

Factors Determining the Nature of the Teaching-Learning Process

What is it that determines the nature of the teaching-learning process and helps explain why it is different from one time to another or from situation to situation? Although there are no doubt many factors which operate to influence the process, those which appear to be the major determinants are discussed in this section.

Esland (1971) has suggested three major determinants of the nature of teaching to be the teacher's pedagogical perspective, his subject perspective, and his career perspective. In slightly modified form these will be accepted as determinants of the teaching-learning process and a fourth determinant will be added--certain organizational realities.

Pedagogical perspective. Based on assumptions which are accepted regarding such matters as the nature of learning, the child's intellectual status, and appropriate teaching styles, the pedagogical perspective constitutes the rules which control the communication of knowledge as well as "a manipulative dimension which suggests strategies for minimizing the resistance between the teacher's world view and that of the pupil" (Esland, 1971:84).

Basic to this perspective is the psychological model of the child accepted by the teacher. Esland distinguishes two generic types--a psychometric model and the epistemological model of Piaget and Bruner. The psychometric model represents the child as a reified object endowed with an intelligence within which his thinking develops. He is a deficit system to be initiated into the public thought forms which exist outside him. On the other hand, the epistemological model, best typified in the works of Piaget and Bruner, views the child as an active creature involved in constructing and arranging his knowledge of the world in developing interpretational schema. The major point being made is that each of these models appears to be associated with a particular orientation to the role of the teacher and the nature of the activities to be engaged in. It should not be concluded that it is the teacher's pedagogical perspective alone which influences the nature of the teaching-learning process, since many people at various levels make decisions which affect the process directly or indirectly and each might have a different pedagogical perspective.

Curriculum perspective. Esland notes that

> If pedagogical assumptions control the intentionality about how particular knowledge should be arranged, the subject perspective will contain the rationale for why certain knowledge should be taught (Esland, 1971:98).

This perspective includes concern for the "world view" of the subject which is accepted, which problems are considered to be important for the subject, what emphasis should be given to content and to process, and the criteria of utility which are accepted whether extrinsic or intrinsic. If it can be accepted that curriculum is "the content of instruction and as such is formed from the symbolic content of culture and can be acted upon by the teacher, learner, and setting" (Maccia, 1972:10), then it might be more appropriate to think in terms of a curriculum perspective than a subject perspective. As was pointed out in the discussion of the pedagogical perspective, many people make curriculum decisions which affect the teaching-learning process and all might not share the same perspective.

Career perspective. Teachers do not operate in isolation but are members of a larger community of educators and perform a function for an even larger public. These reference groups, too, have particular orientations in their explanation of human nature, learning, and many other related matters. The teacher's career perspective focuses on some of the professional and institutional constraints on the teacher's understanding of his work. It concerns the teacher's perceptions of and access to individuals and groups within society and within the profession which serve as centers of legitimate ideas to whom he can or should refer for his definition of the curriculum and its pedagogy and the extent to which these influence his behavior.

Organizational realities. As was just pointed out, the teacher might be influenced by his reference to significant others within the organization for ideas and for legitimation of practices. In addition, there are other organizational realities which serve to influence the nature of the teaching-learning process. Such realities include characteristics of organizational structure and patterns which are imposed and within which the process must function, and the availability and allocation of various resources including human resources, material resources, time, and space.

It might be implied from the foregoing that teachers and others who make decisions relating to the teaching-learning process are conscious of these factors which influence the process, that they have internalized them, or that they operate consistently in accordance with them. This is not necessarily the case. Indeed, it is more likely that these people behave without being aware of what motivates them, and the perspective which determines their behavior might not be internalized but merely be accepted by them even though they may be somewhat in disagreement with it. The relationships between these determinants of the teaching-learning process and the nature of the process as it occurs appear to be very complex.

Characterizing the Teaching-Learning Process

The determinants of the teaching-learning process manifest their influence in the characteristics of the process in particular situations. There are no doubt many ways to characterize the teaching-learning process but in terms of what appears to be a logical derivation from the determining factors discussed, and in line with many of the considerations from the literature on organizational technology, the various process activities are described here with reference to three characteristics: locus of decision, degree to which activities are programmed, and uniformity of practice.

Locus of decision. It is possible to view the sources of decisions concerning the activities of the teaching-learning process along a continuum with the student at one extreme and a source entirely outside the class setting at the other with various combinations of students, teacher, and outside source between. The process can then be described in terms of the proximity of decision making to the student or in terms of the locus of various decisions. The alternative modes of program operation described by Worth (1970) differ essentially in the locus of authority for major decisions.

Degree to which activities are programmed. March and Simon (1958) discuss the behavior of persons in an organization in terms of the extent to which individual activities are programmed. To the degree that choice has been simplified by the development of a fixed response to defined stimuli, the activities are routinized or programmed and, "The greater the programming of individual activities in the organization, the greater the predictability of the activities" (March and Simon, 1958:143). This is very similar to one of the major components of the model of technology proposed by Perrow. March and Simon further postulate that "The greater the repetitiveness of individual activities, the greater the programming" (March and Simon, 1958:143). The corollary of this might also be true that "The greater the programming of activities, the more repetitive they will be" which suggests that the degree to which activities are programmed might be evident in the extent to which practices change over time.

Uniformity of practice. In the educational literature as well as in the literature on organizational technology, a considerable amount of attention is given to the extent to which instruction is or should be individualized both procedurally and substantively, or the extent to which raw material is treated as unique. In some situations and for some activities the teaching-learning process might be characterized by uniform application to all students in the specific populations concerned, while at the other extreme, application might be to individual students only. Thus, the extent to which there is uniformity in the application of practices can serve to differentiate one teaching-learning situation from another.

CONCEPTUAL FRAMEWORK

A summary of a number of the issues presented in this chapter will serve to provide the conceptual framework for this study.

Organizations can be studied in terms of their primary production processes or technologies. Schools are open systems in that they engage in exchanges with the environment and they function in terms of input-throughput-output processes. The primary process of the school is the teaching-learning process which is defined by the activities engaged in when a teacher teaches something to a student or group of students in a particular situation. As shown in Figure 3, these activities consist of defining instructional objectives, selecting and using instructional resources, grouping students, sequencing the workflow, instructing, evaluating, and controlling students. The nature of these various process activities in any situation is determined primarily by the pedagogical perspective accepted by those making decisions regarding the activities, the curriculum perspective which is accepted, the career perspective of the teacher, and various organizational realities. This results in a process which can be

FACTORS DETERMINING THE NATURE OF THE TEACHING-LEARNING PROCESS

Pedagogical Perspective
- Assumptions about the child's intellectual status
- Assumptions about learning
- Assumptions about teaching style

Curriculum Perspective
- Content considered to be important
- Relative emphasis given to content and process
- Criteria of utility accepted

Career Perspective
- Degree of public legitimacy for definition of appropriate curriculum and pedagogy
- Perception of crucial diffusion centres of legitimate ideas and degree of access to them
- Significant others who reinforce perceived reality

Organizational Reality
- Characteristics of organizational structure
- Availability and allocation of resources

PROCESS ACTIVITIES

RESULTING CHARACTERISTICS OF PROCESS ACTIVITIES	Defining instructional objectives	Selecting and using instructional resources	Grouping of students	Workflow sequencing	Methods and activities of instruction	Evaluation	Student control
Locus of decision (student --- source outside the class situation)							
Degree to which activities are programmed (very frequent change --- no change at all)							
Uniformity of practice (individual student --- all students in the grade)							

Figure 3. A Conceptualization of the Teaching-Learning Process

characterized in terms of the locus of decisions regarding the process activities, the degree to which these activities are programmed, and the extent to which the activities apply uniformly to students.

Chapter 3

DESIGN AND METHODOLOGY

This study was designed as a methodological, exploratory study. Kaplan (1964) has observed that methodological experiments "serve to develop or to improve some particular technique of inquiry" (Kaplan, 1964:148). A prerequisite to the development of such a technique is the need to possess the relevant facts about the nature of the subject matter of the inquiry or to formulate a conceptualization of the phenomena to be examined. During the course of developing and refining the research instrument which might provide a description of the various dimensions of the teaching-learning process as perceived by teachers, an opportunity was provided to gather information about differences which might exist in the process variables in different situations. Since no *a priori* hypotheses had been formulated about the nature of such differences, the study had a definite exploratory quality which, as Kaplan (1964) notes, "invites serendipity, the chance discovery" (Kaplan, 1964:149).

The methodology used both in developing the instrument and in gathering data by its use is elaborated in this chapter.

INSTRUMENT DEVELOPMENT PROCEDURES

The specific procedures which were used in developing, refining, and testing the research instrument are described in detail in the next chapter. In this section the general approach taken in the development of the instrument is presented.

It was decided at an early stage in the study that one obvious way to obtain information concerning the teaching-learning process as it occurs at the classroom level of operation would be to ask teachers directly by soliciting from them responses to questions related to the process. Furthermore, to facilitate ease of response by teachers and easier handling of data by the researcher, a multiple-response format was selected which, it was hoped, would cover the range of possible responses to characterize the situations described by the items in each area of concern.

It was readily acknowledged that the teaching-learning process as participated in by most teachers is not a stable, uniform process. The instrument which was developed was concerned with documenting the extent to which there is variation from one teacher to another. However, since there was concern to arrive at some index or composite description of the teaching-learning process as participated in by individual teachers, it was decided to "force" respondents into describing what was typically the case with respect to all the classes and/or subjects they taught. Although rather a global indicator, this should provide evidence of trends or tendencies.

The conceptual framework presented in the previous chapter served to outline the general parameters of what the instrument was to measure and the manner in which the teaching-learning process was to be characterized. The specific items which might serve to measure these various aspects of the process were derived from a number of sources including the experience of the researcher and of others knowledgable about activities of the teaching-learning process, the body of literature related to classroom operations, and instruments developed in related areas. In this latter source was the Dimensions of Schooling, a 28 item questionnaire developed at the Ontario Institute for Studies in Education for use in describing open education in terms of observable characteristics of school programs (Traub et al., 1972). Although the format and proposed use of Dimensions of Schooling were different from that adopted in this study, the fact that it too was based in part on Gibbons' model made it particularly useful.

Once the format of the instrument was decided on and a pool of items which appeared to represent the domain of interest was gathered, a draft questionnaire was prepared and revised several times primarily on the basis of information gathered by its use. A detailed description of the procedures followed is presented in

Chapter 4.

DATA COLLECTION

Data were gathered at three different times during the study corresponding to the three major stages in the development and testing of the instrument (Figure 4). An early draft of the questionnaire was circulated to 28 people who were familiar with the activities of the teaching-learning process. These included twelve students in an evening class in a graduate course in Educational Administration, five members of the Faculty of Education, four graduate students in the Department of Educational Administration, and seven teachers currently teaching in elementary, junior high, and senior high schools. In addition to receiving written comments from these people, personal discussions were held with ten of them. The second stage of data collection was the administration of a revised form of the questionnaire in a Pilot Study to a sample of 99 teachers at grade levels from I - XII in a variety of subject areas in nine schools of the Edmonton Separate School System. Discussions were also held with eight of those who responded to this draft of the questionnaire. The final stage of data collection was the administration of the final form of the questionnaire to 247 teachers from a stratified random sample of 13 elementary, junior high, and senior high schools in the Edmonton Public School System.

Stage	Sample	Number
Reaction to an Initial Draft	Students in an Evening Course in Educational Administration	12
	Faculty Members in Education	5
	Graduate Students in Education	4
	Teachers in Elementary, Junior High, and Senior High Schools	7
	Total	28
Pilot Study	Teachers in Elementary-Junior High Schools	61
	Teachers in Senior High and Junior-Senior High Schools	38
	Total	99
Use of the Final Form	Teachers in Elementary Schools	72
	Teachers in Junior High Schools	82
	Teachers in Senior High Schools	93
	Total	247

Figure 4. Stages of Data Collection

The procedure used for data collection was the same for the last two stages. Copies of the questionnaire, with a letter outlining the purpose to be served by this particular stage of the study and the procedures to be followed, were delivered to the participating schools for distribution to full-time teachers. Teachers were asked to respond as directed in the questionnaire and to return the completed questionnaire, sealed in the envelope provided, at the end of a specified time period, usually one week. Such a procedure was considered to be appropriate since: the directions for responding to the questionnaire were considered to be straightforward; the time interval provided time for respondents to complete the questionnaire without undue pressure; and there was not a great risk of responses being biased by the opportunity for collaboration among respondents since the information requested was more factual than attitudinal.

STATISTICAL PROCEDURES

This section presents a discussion of the statistical procedures used in the development of the questionnaire and in the analysis of data from its final administration. The questions of validity and reliability, which assume considerable importance in any empirical study, are of major importance in a study purporting to be methodological in orientation. Therefore, the relevance of the various statistical procedures for validity and reliability is discussed when appropriate as each procedure is described; in addition, other considerations relevant to validity and reliability are dealt with at the end of the section.

Factor Analysis

Although the argument has been advanced that it is more appropriate to investigate the factorial composition of measures after they are constructed than to construct measures on the basis of factor analysis (Nunnally, 1967: 255), the position taken in this study was to do both. In a general way the dimensions of the teaching-learning process were proposed in the conceptual framework which has been presented. However, the precise nature of these dimensions would be better understood by empirical examination. Kerlinger (1967:650) notes that "factor analysis is a method for determining the number and nature of the underlying variables among a large number of measures." Since it is quite possible that an underlying variable, factor, or dimension is defined by several measures, the cause of scientific parsimony can be served by selecting those measures which best define the dimension. Indeed, Harman (1968:145) considers that a principal aim of factor analysis is "to attain scientific parsimony or economy of description." It seemed quite appropriate therefore, to employ the method of factor analysis in developing the instrument and in investigating the nature of the underlying dimensions of the teaching-learning process.

A number of issues appear in the use of factor analysis which must be resolved in terms of the purpose to be served by its application. Hakstian and Muller (1973) present a rationale for the resolution of a number of these issues in which they divide factor analytic research into that based on either taxonomic or explanatory interests. The taxonomic view considers factors as merely convenient groupings of variables with little construct validity or epistemological status. Such a clustering of variables can be determined by the use of the component model of analysis. The explanatory view, on the other hand, regards factors as causal agents that determine the covariation among the more phenotypic constructs in the domain of interest and are valid and replicable. Such a view is best served by the adoption of either the common-factor model or the image model.

The view of factor analysis adopted for this study seemed to parallel most closely the explanatory view, since there was considerable interest in the theoretical and conceptual importance of the derived constructs. Therefore, the common-factor model was adopted and the option selected for use was the maximum-likelihood method because, of the common-factor options available, it incorporates a statistical test for the number of factors to retain. This difficult and controversial question of the appropriate number of factors to retain was resolved by recourse to an objective, statistical decision. Where no a priori hypothesis was made regarding the number of factors, and where, from an explanatory viewpoint there was interest in obtaining all conceptually relevant factors, this seemed to be a reasonable solution to the question. Using the chi square test of goodness-of-fit this procedure tests each common factor against the null hypothesis that the subsequent factors are too small to be credited to anything but chance (Rummel, 1970:355). Although the maximum-likelihood factor analysis method was selected for use, one of the difficulties with the method is that convergence cannot always be assured (Harman, 1968:154). When a converged solution was not obtained, the partially-converged maximum-likelihood solution was used to test for the number of factors and then an unweighted least squares common-factor solution was obtained (Hakstian and Bay, 1972).

One final consideration regarding the factor analytic procedure used concerned the transformation of the unrotated factor pattern matrix. To facilitate interpretation of factors it is usual to transform the matrix by rotating the factors to a pattern corresponding as closely as possible to Thurstone's (1947) notion of simple structure in which each factor should be interpretable in terms of a small number of variables. Since no a priori hypothesis regarding the nature of the factors was made, and since there was no particular reason to seek to obtain uncorrelated constructs, a blind, oblique transformation seemed appropriate; that is, a set of factors which might be correlated with each other and which are arrived at in an objective manner. Harris and Kaiser (1964) have provided such a transformation procedure which has two versions--the independent cluster version and the A'A proportional to L version (where A'A is the primary-factor pattern matrix and L is the intercorrelation matrix for the primary factors). Both of these were computed for each factor pattern matrix and the one selected was that having the highest "hyperplane count": the number of primary pattern coefficients in the hyperplane defined as those within the range 0 ± .100. Such a procedure is recommended by Cattell (1965) as a way of more closely attaining unique simple structure which gives the clearest factor solution.

In the final administration of the questionnaire, data were used to determine what differences, if any, existed between scores of teachers in different types of schools, different schools within each type, and different subject area specializations. In addition to using the total scores on each part of the questionnaire for this purpose, use was also made of factor scores as measures of the specific underlying dimensions of each scale. These factor scores were computed by the regression method in which factor scores are estimates from the raw data rather than exact factor scores as might be computed when the component model or the image model is used. The factor scores were standardized to a mean of 50 and a standard deviation of 10.

The specific items constituting the instrument which was developed in this study were, to a degree, the variables of interest which could be measured with relative ease and therefore did not need to be validated in the usual sense. However, these variables also represented more abstract underlying variables or dimensions usually referred to in psychometric theory as constructs. Such constructs, though defined by the specific measures (items), extend well beyond the operations manifested in the responses to these measures. Since the interest of this study was primarily in the existence and nature of these more abstract underlying dimensions, some indication of the validity of the measures of these dimensions was desirable. In this sense validity relates to what Cattell (1964:115) refers to as "the capacity of a test to predict some specified behavioral measure (or set of measures) other than itself," and the specific aspect of validity which is of primary concern is generally referred to as construct validity.

Kerlinger (1967) points out that it is helpful in studying the construct validity of a measure (e.g. an item) to correlate it with other measures or better still, to correlate it with a large number of measures. Factor analysis is an essential tool in this regard since it tells which measures measure the same thing and to what extent.

Item Analysis

To provide criteria for selecting items to be used in the final draft of the instrument as well as evidence relating to the reliability of the measures obtained, extensive item analysis was performed on the data gathered at various stages in the study. This analysis focused on item to total scale correlations, item to subscale correlations, and item intercorrelations all of which relate to the internal consistency of the measures which is a particular aspect of reliability. Nunnally (1967:261) suggests that when items predominantly correlate positively with one another, the best items are those with the highest average correlations and, since this is closely related to the correlations of items with total scores, the items that correlate most highly with total scores are the best items. In addition, such information has relevance for validity. The item-factor correlations in an oblique factor solution are provided by the primary-factor structure matrix. The coefficients of this matrix therefore, can also serve as estimates of the construct validity of the items. Guilford (1965:481) points out that the goals of reliability and validity are sometimes incompatible. Maximal reliability requires high intercorrelations among items, whereas maximal predictive validity requires low item intercorrelations. He proposes a compromise in which item-total correlations for well constructed items range between

0.30 and 0.80 which means item intercorrelations approximately between 0.10 and 0.60.

Analysis of Variance

One way to describe behavior associated with a particular group is to compare it with that demonstrated by other groups. This was the approach taken in describing the teaching-learning process in various situations.

The scores obtained by teachers on each of the three subscales, as well as the factor scores which were used as measures of the underlying dimensions of each scale were subjected to one-way analyses of variance with respondents classified by type of school, by schools of each type, and, for junior and senior high school teachers, by subject area specialization. Where it was found that scores for various groups differed significantly, with a significance level set at the .05 level, the Scheffé method of multiple comparison was used to test for the significance of differences between means, again with a .05 level of significance. Ferguson (1971:271) describes this test as being more rigorous than other methods of multiple comparison with respect to Type 1 error (rejecting the null hypothesis when it is true) and it has the added advantage for this study that "No special problems arise because of unequal n's."

Other Considerations with Respect to Validity and Reliability

Validity. In the discussion of factor analysis as it relates to validity it was stated that a major concern in this study was with construct validity. Although this was so, some comment on two other types of validity should be made.

Content validity, the representativeness of the sampling of content, inevitably rests on an appeal to reason with respect to the adequacy of the procedures employed in sampling content from the domain of interest and the manner in which it is presented. Rather than test for content validity after the measure is constructed, one should ensure validity by the plan and procedures of construction (Nunnally, 1967:80). The conceptual framework which was developed, the reliance on what appeared to be reasonable sources for items, and the procedures employed in developing the instrument were all directed towards ensuring adequate content validity.

Criterion-oriented validity is concerned with the extent to which test scores relate to some event or behavior occurring before, during, or after the instrument is applied and therefore, includes what is usually referred to as predictive validity and concurrent validity. Except in the sense that the specific measures used were intended to predict the presence of underlying dimensions, predictive validity was not considered to be important. The purpose of the instrument was to measure specific variables of the teaching-learning process as they existed then and there, not to estimate scores on any other variables obtained in the past, present, or future. In a sense the validity of the instrument could not be determined by correlating it with a criterion because the instrument itself was the criterion of performance.

Reliability. The evidence obtained from item-subscale and item-total scale correlations has to do with internal consistency as indication of the reliability of the measures developed. One further estimate of reliability obtained was the coefficient alpha, an estimate of internal consistency based on average correlations of items within a scale. Nunnally (1967:211) claims that such a coefficient provides "a good estimate of reliability in most situations, since the major source of measurement error is because of the sampling of content." The coefficient alpha for total scales and for individual subscales was calculated.

DELIMITATIONS, ASSUMPTIONS, AND LIMITATIONS

Delimitations

This study examined the teaching-learning process at the classroom level of operation as perceived by teachers engaged in full-time teaching. The process was defined in terms of specific dimensions of activities and practices as delineated in the conceptual framework presented in Chapter 2. This framework excluded consideration of the affective dimensions of teacher-student and student-student interaction.

The study was further restricted to teachers in schools with various grade combinations from K - XII in two urban school systems.

Assumptions

Some assumptions were made particularly with reference to the collection of data.

It was assumed that teachers understood what was being asked of them in the questionnaire and that they had access to the information requested. It was further assumed that teachers could accurately judge and report what constituted "typical" practice with respect to the class(es) in which they taught. A final assumption was that the fact that teachers had an opportunity to discuss their responses to the questionnaire with other people would not bias the responses obtained.

Limitations

In addition to the limitations inherent in the delimitations and assumptions just presented, the study was further limited by the adequacy of the conceptualization developed and the research design used. Since the final form of the questionnaire was administered to teachers in a random sample of schools in one urban school system, inferences to teachers and schools beyond this system may not be justified.

SUMMARY

In this chapter the study was described as a methodological, exploratory study concerned with developing an instrument to measure dimensions of the teaching-learning process and in using the instrument to determine what differences, if any, existed in the process as it occurred in different school situations. The instrument developed took the form of a questionnaire with three multiple-response scales which might be used to solicit from teachers their perceptions of dimensions of the teaching-learning process as they occur in their class(es). The development and testing of the questionnaire was carried out in three major stages with data collected at each stage. The statistical procedures employed were factor analysis, various item analysis techniques, and analysis of variance. These procedures were discussed with particular reference to the rationale for their use and their relevance to questions of validity and reliability. Finally, the major restrictions of the study were described as those related to the conceptualization developed, the technique of data collection, and the sampling procedure used.

Chapter 4

INSTRUMENT DEVELOPMENT

The specific procedures followed in the development and analysis of the instrument intended to measure aspects of the teaching-learning process are described in this chapter. Particular attention is given to the criteria used for item selection, to the results of the factor analysis and item analysis of data collected in the Pilot Study, to the reliability estimates obtained, and to changes made in the instrument at each stage of its development.

THE INITIAL DRAFT OF THE QUESTIONNAIRE

Construction of the Initial Draft

As noted in the previous chapter the sources from which items were derived included the experience of the researcher and of others knowledgable about activities of the teaching-learning process, relevant literature, and instruments already developed. The items derived were used to construct an initial draft of the instrument. The instrument took the form of a three part questionnaire; each part was concerned with one of the characteristics of the teaching-learning process as proposed in the conceptual framework and the items focused on various sets of activities which define the process. The three parts of this draft contained a total of 110 items. Table 1 shows the seven categories of activities of the teaching-learning process with a representative item for each category and the distribution of the items in each category for the three parts of this initial draft.

Part I--Degree of Specification. This part of the questionnaire contained 39 items and was an attempt to determine the extent to which activities are programmed by asking respondents to indicate the extent to which there existed specification regarding the matters referred to by the items. The response categories were:

A. TO A VERY GREAT EXTENT. The matter is clearly specified either in writing or orally. Such specification might originate from any of a variety of sources such as, administrators, teachers, students, or a combination of these.

B. TO A CONSIDERABLE EXTENT. There is a general understanding regarding the matter with a limited degree of latitude for modification.

C. TO A MODERATE EXTENT. There is a general understanding regarding the matter but adequate provision is made for modification.

D. TO A VERY LITTLE EXTENT. There are suggestions made regarding the matter but such suggestions need not be followed.

E. NOT AT ALL. There are no specifications or suggestions regarding the matter. The uniqueness of each case determines what is done.

Part II--Proximity of Decision Making to the Student. This part contained 40 items, most of which were repeated from Part I. The five response categories were:

Table 1

Categories of Process Activities, Representative Items, and Distribution of Items in Each Category

Category of Process Activity	Representative Item for Each Category	Number of Items		
		Part 1	Part 2	Part 3
Defining Instructional Objectives	The instructional objectives to be achieved by student activities	1	1	1
Selecting and Using Instructional Resources	The instructional materials other than textbooks which are used	15	15	11
Grouping of Students	The basis on which students are assigned to a class	4	5	2
Workflow Sequencing	The pace at which content is to be covered by students	5	5	5
Methods and Activities of Instruction	The methods of learning and problem solving used by the student	5	5	3
Evaluation	The methods of evaluation which are used	3	3	3
Student Control	Rules for student conduct while engaged in class related activities	6	6	6

A. OUTSIDE SOURCE. A source outside the class setting makes the decision (e.g., central office, school administrators, other teachers).

B. OUTSIDE SOURCE AND TEACHER. An outside source and the teacher make the decision.

C. TEACHER. The teacher alone makes the decision.

D. TEACHER AND STUDENT. The teacher and the student(s) make the decision with or without the help of an outside source.

E. STUDENT. The student alone makes the decision. Such a decision might be made after consultation with parents or friends but is essentially the student's decision.

Part III--Degree of Differentiation. This part of the questionnaire was concerned with the extent to which practices applied to all students, to some students, or to individual students. It consisted of 31 items, most of which also appeared in Parts I and II. The response categories were:

A. ALL STUDENTS IN THE GRADE. The same for all students at this grade level in the school.

B. ALL STUDENTS IN YOUR CLASS(ES). The same for all students in your class but not for all students at this grade level in the school.

C. ALL STUDENTS IN A SUBGROUP OF YOUR CLASS(ES). The same for all students in a subgroup of your class but not for the whole class.

D. INDIVIDUAL STUDENTS. Applies to individual students only.

Reaction to the Initial Draft

This draft of the questionnaire was circulated to a number of people familiar with the activities of the teaching-learning process. Fourteen students registered in an evening class of a graduate course in Educational Administration at the University of Alberta were asked to respond to the questionnaire with reference to the class(es) of students they were teaching or had taught most recently and to comment critically on the questionnaire. These people were all active in teaching or administration or both. Twelve responses were received. Reaction was also received from five faculty members and four graduate students in the Faculty of Education, and from seven teachers currently serving in elementary, junior high, and senior high schools. In addition to analyzing written comments, the questionnaire was discussed with ten of the respondents in individual sessions lasting from ten minutes to one hour in duration. The various written and oral comments on the format, adequacy of item sampling, and on individual items were recorded and used to revise this draft of the questionnaire.

Changes Made in the Initial Draft

Taking into account the reactions to the initial draft of the questionnaire a number of changes were made. Many of these changes were editorial in nature and concerned such matters as deletion of items, rewording of items, rewording of section titles, and minor changes in format. However, one major change was also made at this stage. It became evident that the section entitled "Degree of Specification" was being interpreted differently by different persons and was a source of confusion to others. It was doubtful that valid information concerning the extent to which practices were programmed could be obtained in this way. An alternative which was adopted was to determine the extent to which practices changed over time, the assumption being that, if practices were programmed, there would be a tendency for them to change very little, whereas non-programmed practices would tend to change frequently. Therefore, this section was changed to "Change in Practice Over Time" and the response categories were revised to the following:

A. AT LEAST ONCE A DAY
B. AT LEAST ONCE A WEEK
C. AT LEAST ONCE A MONTH
D. AT LEAST ONCE A YEAR
E. NOT AT ALL DURING THE YEAR

In addition to the 90 items contained in Parts I, II, and III of the questionnaire a Part IV was added with three items designed to obtain information about the teacher's teaching assignment. Information of this type would be required in using the final draft of the questionnaire, so it was added at this stage in order that it might be checked out in the Pilot Study. The revised draft of the questionnaire which was used in the Pilot Study is included in Appendix A.

THE PILOT STUDY

The revised form of the questionnaire, Descriptors of the Teaching-Learning Process, was used in a Pilot Study in order to obtain information which might be used to determine whether or not there were difficulties in responding to the questionnaire in this form, which items should be included in any further revision of the questionnaire, and some evidence of the validity and reliability of the questionnaire.

Sample, Administration, and Scoring

A request was made to conduct the Pilot Study in the schools of the Edmonton Separate School System. Nine schools were selected on the basis of representativeness of the types of schools in the system and the willingness of the principals to request teachers to participate. Six of the schools included were elementary-junior high schools, one was a junior-senior high school (the senior high division was primarily involved in the study), and the remaining two schools were senior high schools. A total of 156 questionnaires was distributed to teachers in these schools; 104 to teachers in elementary-junior high schools and 52 to teachers in senior high and junior-senior high schools. A total of 112 questionnaires was returned of which 13 were incomplete, so that the total number of usable responses was 99; 61 from elementary-junior high teachers and 38 from senior high and junior-senior high teachers. This represented a return of 63.5 percent usable responses. In order to permit comparison with the sample used in the administration of the final draft of the questionnaire, Table 2 shows the distribution of teachers in the Pilot Study by the grade levels at which they taught.

Table 2

Distribution of Teachers in the Pilot Study by the Grade Level Taught

Grade Level	Number	Percent
Elementary (I - VI)	20	21.5
Junior High (VII - IX)	23	24.7
Elementary-Junior High (I - IX)	13	13.9
Senior High (X - XII)	34	36.5
Junior-Senior High (VII - XII)	3	3.2
Total	93*	99.8

*Six teachers did not respond to this item

Table 3 presents the distribution of teachers at the junior and senior high school levels by the subject areas for which they were responsible for more than half of their teaching time. Again for the sake of comparison an attempt is made to present the subject areas in a manner consistent with that for the sample used in the administration of the final draft of the questionnaire.

The questionnaires were administered in the manner described in the previous chapter by delivering copies to the participating schools for distribution to full-time teachers. In addition to being asked to respond

Table 3

Distribution of Junior and Senior High School Teachers in the Pilot Study by Subject Area Specialization

Subject Area	Number	Percent
English-Social Studies	17	32.0
French-Foreign Languages	1	1.8
Mathematics-Science	19	35.8
Fine Arts	3	5.6
Physical Education	5	9.4
Home Economics	2	3.7
Industrial Arts	4	7.5
Business Education	2	3.7
Total	53*	99.5

*Twenty junior and senior high school teachers did not respond to this item or spent half or less of their teaching time in a subject area to the questionnaire, teachers were invited to comment critically on any aspect of it. To obtain further reaction to the questionnaire, arrangements were made to discuss it with a number of the respondents. Eight teachers from two schools and from elementary, junior high, and senior high grade levels participated in these discussions. A number of issues were discussed particularly those related to interpretation of items and of response categories. These reactions proved to be useful in the later revision of the questionnaire.

The responses to the items in Parts I, II, and III of the questionnaire were scored in the following manner:

Part I--Locus of Decision

A = 5, B = 4, C = 3, D = 2, E = 1

The possible range of scores was from 35 to 175 with the higher scores indicating a tendency for locus of decisions to be further from the student.

Part II--Change in Practice Over Time

A = 5, B = 4, C = 3, D = 2, E = 1

The possible range of scores was from 24 to 120 with the higher scores indicating the greater amount of change over time.

Part III--Uniformity of Practice

A = 4, B = 3, C = 2, D = 1

The possible range of scores was from 31 to 124 and the higher scores indicated a tendency for greater uniformity of practice.

Questionnaires were rejected if more than four items on any part were found to be unanswered. Otherwise, where an answer had been omitted, the mean score for the other items in that part was entered.

Criteria for Item Selection

In constructing the early drafts of the questionnaire an effort was made to represent adequately the universe of items defining those aspects of the teaching-learning process conceptualized as being of importance. The draft used in the Pilot Study was intended to include more items than would be necessary or desirable for the final form. Therefore, three criteria were used as a basis for selecting an adequate number of good items for use in a revised form of the questionnaire: construct validity, internal consistency, and practicality.

Construct validity. The items retained should define some conceptually meaningful dimensions of the teaching-learning process. This criterion was based on factor analysis and was considered to be satisfied when the items defining a factor had loadings $\geq .300$ on both the primary-factor pattern and the primary-factor structure and the factor so defined was interpretable.

Internal consistency. The item analysis performed was primarily concerned with retaining items which contributed to the reliability of the measures obtained, especially as it related to variation within the measuring instrument--the extent of variation in performance from item to item--which is generally referred to as internal consistency. Where there were more items defining a factor than was considered practical to include in a revised form, the items retained were those which had the highest correlations with the total score for the items defining that factor, excluding the item being correlated. Account was also taken of Guilford's (1965) suggestion that the best items in a homogeneous measure are those with item-total correlations ranging between 0.30 and 0.80.

Practicality. Although validity and reliability may be considered to be the major considerations in developing measurements, attention must also be given to a number of practical considerations which might influence the success or otherwise of their use. Such considerations include the ease of administration, scoring, and interpretation of the measure (Thorndike and Hagen, 1969). A consideration having implications for item selection is the length of the measuring instrument. Obviously, the longer a questionnaire is, the more information which can be obtained by its use and, usually, the more reliable it is. However, great difficulty would be encountered in seeking the cooperation of teachers to respond to a questionnaire which might require an unreasonable amount of their time. The decision as to how long a questionnaire of this type should be is somewhat arbitrary; however, the information gained from the reaction of respondents to the questionnaire used in the Pilot Study confirmed what had been expected--the 90 item questionnaire was longer than was desirable from this practical consideration. Therefore, it was decided that the revised form of the questionnaire would not contain more than 20 items in each of the three parts.

Analysis of Data for Part I--Who Makes Decisions

A principal component analysis was first performed on the 35 x 35 $\underline{R}$ (Pearson product-moment correlation) matrix of variables for Part I of the questionnaire and the 35 eigenvalues were subjected to a "scree" test (Cattell, 1966) as a possible means of determining the appropriate number of factors to extract. This test notes the point at which there is a distinct leveling off in the curve when the eigenvalues are plotted on a graph and suggests that point as the appropriate place to stop factoring. The results of this test were not unequivocal, but the hypothesis of four factors appeared reasonable. Next, a maximum-likelihood factor analysis was performed on the $\underline{R}$ matrix. Although iteration was not carried to a converged solution, the goodness-of-fit test which was performed indicated that, with a significance level of .05, the hypothesis of four factors should be rejected. A maximum-likelihood procedure was again used, this time with five factors. Iteration to a converged solution yielded a chi square value of 452.54 (df = 430) which fell well below statistical significance (p = .22), indicating that five factors were appropriate for the data. Two Harris-Kaiser oblique transformations were performed on the maximum-likelihood factor pattern--the *independent cluster* version and *A'A proportional to L* version. Using the hyperplane count as the basis for decision, it was determined that the *independent cluster* version gave the clearest final solution for the primary-factor pattern matrix. In instances where the coefficients of variables defining a factor were negative, the factor was reflected. The matrix obtained with Factors I, II, and V reflected is presented in Table 4.

In common-factor analysis the primary-factor pattern matrix provides the most interpretable factor loading matrix. The elements of this matrix are regression coefficients for predicting the variables from the factors. In addition, the oblique solution provides a different matrix known as a primary-factor structure matrix the elements of which are correlations between the variables and the factors. The primary-factor structure matrix for Part I is given in Table 5. In accordance with the criteria discussed earlier, items were not retained for inclusion in the revised questionnaire which did not have loadings $\geq .300$ on both the primary-factor pattern and the primary-factor structure. Therefore, items 1, 9, 13, 15, 30, and 34 were deleted from further consideration.

Although it was shown to be statistically appro-

Table 4

Oblique Primary-Factor Pattern Matrix--
Who Makes Decisions
(N=99)

Item	Factors				
	I	II	III	IV	V
1	090*	080	175	317	-402
2	-101	220	-115	439	-185
3	-111	282	131	482	-418
4	032	133	-041	560	-096
5	130	-030	-132	510	136
6	211	-054	-100	379	375
7	147	-256	140	602	104
8	105	-173	-126	528	029
9	209	075	-320	189	-019
10	764	-039	-047	237	-133
11	903	065	032	-138	066
12	060	233	162	332	-077
13	028	023	181	262	231
14	031	-089	612	174	-186
15	-097	096	285	205	097
16	071	-108	780	-172	-038
17	027	-052	125	172	422
18	-027	-033	-083	111	429
19	-321	018	114	584	087
20	-007	653	-107	-135	010
21	-096	734	-040	056	-167
22	-025	021	-042	012	512
23	-068	111	014	-077	555
24	078	012	124	-098	494
25	052	102	020	-107	517
26	-230	002	254	274	347
27	-116	344	-014	125	377
28	-055	396	019	-006	266
29	-036	390	005	124	183
30	006	178	247	-052	028
31	052	447	296	-135	114
32	027	611	083	000	061
33	111	641	-054	012	-164
34	241	115	-029	187	189
35	083	465	078	070	049

*Decimals have been omitted

Table 5

Oblique Primary-Factor Structure Matrix-- Who Makes Decisions
(N=99)

	Factors				
Item	I	II	III	IV	V
1	217*	092	148	249	-214
2	082	242	-097	400	016
3	131	267	112	402	-127
4	250	284	019	576	144
5	282	210	-034	579	288
6	273	065	016	490	413
7	301	052	208	618	266
8	205	025	-077	504	132
9	237	150	-255	247	027
10	809	239	083	432	002
11	891	355	211	217	139
12	274	359	255	417	167
13	182	233	266	378	374
14	155	006	580	149	-023
15	068	211	323	265	257
16	117	-030	751	-121	037
17	133	191	230	325	493
18	027	140	010	234	435
19	-087	151	132	522	291
20	149	593	-015	069	182
21	147	651	028	200	108
22	030	201	069	186	513
23	002	272	131	133	566
24	122	211	239	119	499
25	105	280	148	127	527
26	-054	183	313	343	476
27	078	484	113	329	535
28	107	477	129	200	410
29	157	487	112	303	369
30	158	233	289	062	136
31	223	510	388	097	302
32	256	656	199	238	310
33	305	612	034	196	078
34	357	324	094	371	316
35	283	546	184	275	272

*Decimals have been omitted

priate to extract five factors from the data, all five were not well defined in terms of the number of items loading on them and were not thought to be conceptually meaningful or interpretable. Furthermore, keeping in mind the criterion of practicality already discussed, it was decided to delete items 10 and 11 which defined Factor I and items 14 and 16 which defined Factor III.

The factors retained up to this point contained nine items each. Since this exceeded the number of items suggested as being desirable for the total scale, and since each of these factors was well defined by such a relatively large number of items, it was decided to delete from each the three items which had the lowest correlations with the total score for the items defining the factor (excluding the score of the item being correlated). These item-subscale correlations are given in Table 6. By this procedure items 27, 29 and 31 were deleted from Factor II; items 2, 3, and 12 were deleted from Factor IV, and items 6, 18, and 25 were deleted from Factor V.

For the 18 items remaining, consideration was given to the extent to which they met the criterion suggested by Guilford (1965). Data from Table 6 show that all of the correlations of items with their subscale scores were within the 0.30 to 0.80 range suggested and when item to total scale correlations were calaulated, these, too, were within this range.

Table 6

Item-Subscale and Item-Total Scale Correlations--Who Makes Decisions
(N=99)

Item	Student Promotion and Conduct	Instructional Materials	Instructional Process	Total Scale
20	.481			.354
21	.505			.425
27	.435		.467	.528
28	.478			.438
29	.469			.483
31	.470			.486
32	.616			.552
33	.495			.423
35	.487			.525
2		.326		.298
3		.306		.336
4		.567		.461
5		.493		.465
6		.364	.286	.402
7		.518		.467
8		.398		.300
12		.344		.504
19		.378		.398
17			.454	.458
18			.357	.322
22			.420	.329
23			.493	.356
24			.439	.340
25			.417	.366
26			.437	.432

A further check on the internal consistency of the total scale was obtained by calculating the coefficient alpha. The coefficient of 0.802 which was obtained was considered to be quite adequate for the present study in that Nunnally (1967:226) has stated that a reliability coefficient of between 0.50 and 0.60 is usually adequate for most basic research while a coefficient exceeding 0.80 would be necessary for most applied research.

Subscales Proposed for Part I--Who Makes Decisions

The items defining the three factors retained on the basis of the analysis discussed in the previous section were proposed as three subscales to measure three underlying dimensions of "who makes decisions" regarding the teaching-learning process. These subscales, with an identification of the dimensions they appear to measure were as follows:

I. CONTROL OF STUDENT PROMOTION AND CONDUCT

Who Decides

20. When students are to be promoted.
21. The basis on which students are to be promoted.
28. The use which is made of the results of evaluation.
32. What action is taken when a student has been absent from class.
33. What action is taken when a student comes to

class late.

35. What action is taken in the event of a serious breach of the rules of conduct.

II. CONTROL OF INSTRUCTIONAL MATERIALS

Who Decides

4. The way in which textbooks are used.
5. What instructional materials other than textbooks are used.
6. The ways in which these other instructional materials are used.
7. The types of A-V equipment which are used.
8. When various items of A-V equipment are used.
19. When particular units or topics are dealt with.

III. CONTROL OF THE INSTRUCTIONAL PROCESS

Who Decides

17. The pace at which content is to be covered by students.
22. What is to be achieved by the activities of students in the class setting.
23. The nature of your role as a teacher in particular teaching-learning situations.
24. The specific teaching methods you use.
26. Whether or not homework is assigned.
27. The methods of evaluation which are used.

It might be pointed out that although the seven categories of activities of the teaching-learning process suggested in the conceptual framework were not maintained in that form, items from each of these categories except "grouping of students" were represented in the three subscales proposed.

Analysis of Data for Part II--Change in Practice Over Time

The 24 x 24 R matrix of variables in Part II was subjected to a principal component analysis. A scree test which was performed on the 24 eigenvalues provided no clear indication of the number of factors to extract. It was arbitrarily decided to begin testing at five factors. The maximum-likelihood factor analysis was applied with hypotheses of five, six, and seven factors and, although iteration was not carried to a converged solution in either case, the goodness-of-fit tests performed indicated that these hypotheses should be rejected. With eight factors, the partially-converged solution yielded a chi square value of 141.92 (df = 112) which fell below statistical significance (p = .08). Because convergence was not achieved with the maximum-likelihood procedure, an unweighted least squares common-factor solution, using the hypothesis of eight factors, was obtained and subjected to both Harris-Kaiser oblique transformations. Again, the independent cluster version gave the clearest primary-factor pattern matrix. This matrix, with Factors I, II, and VII reflected, is shown in Table 7. The primary-factor structure matrix is presented in Table 8.

Table 7

Oblique Primary-Factor Pattern Matrix-- Change in Practice Over Time (N=99)

	Factors							
Item	I	II	III	IV	V	VI	VII	VIII
36	-118*	-070	061	257	125	-016	479	186
37	-077	023	044	-027	-158	-063	983	016
38	104	064	-138	-382	446	356	478	-278
39	-050	-125	-024	-218	902	196	040	032
40	-132	-006	-035	154	909	1019	-025	048
41	152	058	071	116	701	-190	-026	-008
42	579	096	073	171	255	-189	102	-540
43	-034	020	999	-020	-029	005	047	012
44	-001	004	908	021	037	-014	002	-004
45	-066	-044	170	475	142	172	-124	-128
46	-031	014	-083	765	217	-142	064	-003
47	-093	057	-028	490	-086	575	-014	-130
48	260	-056	-060	566	-271	129	187	073
49	-167	045	-028	063	-068	863	019	056
50	334	-042	074	-131	101	383	-015	342
51	605	-031	088	-066	091	392	-239	095
52	1014	-006	-037	003	-057	-014	-009	-031
53	878	-009	-021	034	-010	-100	-023	107
54	374	-012	-078	116	005	-175	209	440
55	152	246	066	-065	245	017	068	296
56	-213	923	-105	152	177	-155	-061	183
57	-132	980	036	028	145	-028	-171	050
58	255	839	-032	-040	-228	113	060	-212
59	084	791	075	-151	-170	092	166	001

*Decimals have been omitted

Table 8

Oblique Primary-Factor Structure Matrix--Change in Practice Over Time
(N=99)

	Factors							
Item	I	II	III	IV	V	VI	VII	VIII
36	437*	216	434	547	541	455	678	355
37	282	270	405	348	421	346	828	148
38	440	331	191	210	662	466	692	119
39	553	169	278	268	842	393	548	357
40	588	259	331	460	864	388	566	373
41	651	290	386	417	807	270	520	353
42	562	238	361	418	565	190	470	-054
43	322	125	996	429	371	281	497	171
44	346	114	928	433	394	271	468	174
45	274	083	374	576	295	418	296	085
46	467	222	323	754	489	432	469	247
47	306	261	263	723	248	758	398	164
48	520	221	310	740	332	587	461	351
49	275	291	181	515	238	834	382	308
50	719	323	328	450	589	636	458	687
51	777	294	313	481	564	605	343	561
52	931	330	280	472	625	415	419	514
53	881	311	274	438	607	355	384	566
54	682	302	234	404	537	335	441	661
55	618	493	302	347	601	405	475	581
56	301	909	017	223	309	239	268	377
57	293	934	085	190	277	263	232	306
58	332	841	066	224	181	335	296	151
59	328	830	163	187	243	339	380	280

*Decimals have been omitted

Using the criterion that items not loading $\geq .300$ on both the primary-factor pattern and the primary-factor structure not be used, item 55 was deleted. Although it was shown to be statistically appropriate to extract eight factors, Factors III and VIII were defined by only two items each and it was very difficult to apply any meaningful interpretation to Factors VI and VII. It was decided, therefore, to retain only the items defining Factors I, II, IV, and V for further consideration.

Since these four factors contained a total of 18 items, it was not necessary to reduce the number further for reason of practicality. However, the item-subscale and item-total scale correlations were examined and are shown in Table 9. In terms of Guilford's suggested range, all but four of these correlations were between 0.30 and 0.80 and these four exceeded the range suggesting that greater reliability might have been achieved at the expense of validity.

The coefficient alpha calculated for this scale was 0.906 which again was considered to be quite acceptable.

Subscales Proposed for Part II--Change in Practice Over Time

The subscales which were proposed as measures of four underlying dimensions of "change in practice over time" were as follows:

Table 9

Item-Subscale and Item-Total Scale Correlations--Change in Practice Over Time
(N=99)

Item	Instructional Process	Student Control	Use of Space and Time	Instructional Materials	Total Scale
42	.435				.565
50	.689				.715
51	.741				.698
52	.835				.723
53	.815				.686
54	.640				.624
56		.838			.536
57		.875			.532
58		.785			.523
59		.788			.556
45			.511		.454
46			.626		.628
47			.617		.561
48			.623		.623
38				.584	.599
39				.769	.608
40				.780	.690
41				.666	.681

I. CHANGE IN THE INSTRUCTIONAL PROCESS

How Often Is There Change in

42. Who uses various items of A-V equipment in your class(es).

50. The instructional objectives to be achieved by student activities.

51. The nature of your role as a teacher in particular teaching-learning situations.

52. The specific teaching methods you use.

53. The methods of learning and problem solving used by the student.

54. The kinds of activities which accompany or follow the study of particular content.

II. CHANGE IN STUDENT CONTROL PRACTICES

How Often Is There Change in

56. The action you take when a student has been absent from class.

57. The action you take when a student comes to class late.

58. Rules for student conduct while engaged in class related activities.

59. The action which you take in the event of a serious breach of the rules of conduct.

III. CHANGE IN USE OF SPACE AND TIME

How Often Is There Change in

45. The location where various learning activities

are carried on whether in a single classroom, a variety of different areas in the school, or various places outside the school.

46. The extent to which students are permitted to move around in their learning environment.
47. The amount of time which is allocated to the specific subject(s) which you teach.
48. The amount of unstructured time during which students are permitted to pursue their own interests.

IV. CHANGE IN INSTRUCTIONAL MATERIALS AND THEIR USE

How Often Is There Change in

38. The way in which textbooks are used.
39. The instructional materials other than textbooks which are used.
40. The ways in which these other instructional materials are used.
41. The types of A-V equipment which are used.

With reference to the categories of activities proposed in the conceptualization of the teaching-learning process, only six of the seven categories were represented in the original 24 item scale. Of these "grouping of students" and "evaluation," each of which contained only one item, were not represented in the subscales presented here.

Analysis of Data for Part III--Uniformity of Practice

As in the analysis of the data for Parts I and II the 31 x 31 $\underline{R}$ matrix of variables for Part III was subjected to a principal component analysis. Once again, the scree test on the resulting eigenvalues was not helpful in determining the number of factors. A maximum-likelihood factor analysis procedure was applied and, with partially-converged solutions, the hypotheses of five, six, seven, eight, and nine factors were rejected as a result of the goodness-of-fit tests performed. A maximum-likelihood factor analysis was again used, this time with ten factors. Iteration to a converged solution yielded a chi square of 227.52 (df = 200) which fell below statistical significance ($p = .09$). Two Harris-Kaiser transformations were again applied to the maximum-likelihood factor pattern and again the independent cluster version gave the clearest solution. The resulting primary-factor pattern matrix with Factors II, IV, and VIII reflected is shown in Table 10, while the primary-factor structure matrix is shown in Table 11.

Only item 81 did not load $\geq$.300 on both the primary-factor pattern and the primary-factor structure and it was deleted. Factors I, VII, IX, and X presented difficulties of interpretation when all items loading on each were considered. It was decided, therefore, to eliminate these as possible subscales.

Factors II, V, and VI presented a different

Table 10

Oblique Primary-Factor Pattern Matrix--Uniformity of Practice (N=99)

	Factors									
Item	I	II	III	IV	V	VI	VII	VIII	IX	X
60	123*	-101	080	-072	-112	908	-005	-030	046	-069
61	-095	178	-027	059	141	600	026	097	002	061
62	-008	974	-013	-024	027	008	001	031	-065	027
63	003	735	-018	097	-030	056	034	-058	226	-136
64	056	015	-018	005	795	193	-016	-031	026	056
65	000	050	069	-044	831	-111	-039	102	113	-057
66	-040	079	007	-031	178	-055	-013	-167	793	082
67	014	-090	126	047	166	-104	105	-178	699	-122
68	148	191	295	-213	-397	089	-240	441	241	-224
69	135	034	143	-013	-195	-264	-016	675	181	-413
70	052	167	-023	-124	-431	128	-069	257	495	210
71	146	240	-056	-018	-265	-021	005	512	100	-009
72	002	075	-089	-163	-090	-047	110	769	017	010
73	-148	-008	-044	013	-004	181	-109	250	476	095
74	-102	016	-139	-025	-036	046	720	-018	219	151
75	-033	081	109	059	-041	008	839	-031	-068	019
76	199	-060	147	091	028	-022	479	334	-167	-158
77	320	023	-053	097	038	-168	169	238	269	-211
78	-162	-166	000	087	168	050	023	883	-030	-024
79	-274	-247	-007	056	101	111	166	692	026	216
80	203	039	102	035	105	061	-176	631	-159	003
81	-088	-216	517	034	133	162	060	286	001	008
82	026	003	1007	-045	031	-034	-040	014	-104	063
83	-003	079	877	113	-068	044	098	-308	191	-189
84	-029	088	675	-144	-154	-159	-015	023	142	327
85	094	-014	-159	-065	-132	-216	060	183	231	620
86	167	-114	099	036	075	126	051	042	-026	475
87	-111	048	058	940	-052	008	-139	065	007	073
88	080	-038	-039	872	074	-013	169	-037	-031	-069
89	978	-004	-006	012	008	-002	-004	005	-007	017
90	416	101	-105	495	-116	032	109	-222	260	-128

*Decimals have been omitted

Table 11

Oblique Primary-Factor Structure Matrix--Uniformity of Practice

(N=99)

Item	Factors									
	I	II	III	IV	V	VI	VII	VIII	IX	X
60	273*	330	385	100	154	871	299	467	413	074
61	230	581	341	174	428	772	285	547	489	147
62	208	973	236	027	510	474	219	462	432	119
63	243	821	301	130	459	485	288	491	562	047
64	305	530	166	111	874	446	127	371	491	097
65	247	530	180	069	907	277	111	399	525	-016
66	332	444	312	187	500	316	274	433	758	190
67	331	248	371	240	376	213	348	392	668	074
68	268	379	525	092	010	439	253	619	492	-002
69	278	238	493	217	080	181	369	650	481	-110
70	383	378	461	236	-002	441	369	588	605	367
71	381	410	440	258	088	354	386	627	473	223
72	285	385	408	146	174	368	427	698	475	136
73	217	370	342	213	297	462	227	545	610	174
74	331	249	351	215	091	288	736	422	456	271
75	418	248	540	335	025	280	876	483	385	267
76	522	216	613	412	116	302	718	627	421	200
77	517	288	428	337	283	210	472	543	566	135
78	284	332	529	368	329	459	404	826	554	144
79	266	215	505	379	186	418	462	715	493	306
80	458	390	518	358	316	420	279	692	454	255
81	385	209	729	423	192	446	461	664	500	241
82	504	232	944	487	070	307	461	600	427	377
83	419	250	845	455	068	336	502	501	502	177
84	445	214	732	383	-040	174	409	486	417	510
85	440	078	255	326	-034	-015	282	280	300	674
86	536	132	437	433	109	252	336	368	318	631
87	369	077	507	941	023	137	194	404	293	477
88	485	050	479	883	101	117	393	382	316	397
89	988	227	517	476	232	238	456	458	467	530
90	604	182	405	604	119	196	396	341	444	337

*Decimals have been omitted

problem. Although only two items loaded on each, the loadings were high and the interpretation of each factor seemed to be clear. All three of these factors had in common their concern with material resources and their use in the teaching-learning process. An examination of the intercorrelations of these three factors revealed that the correlations were relatively high--0.304, 0.490, and 0.518. Furthermore, when the six items were treated as a single subscale, the item-total subscale correlations were high (Instructional Materials Subscale in Table 12). All of these considerations suggested that these six items be combined to form a single subscale concerned with the type and use of instructional materials. The items defining Factors III, IV, and VIII were also retained as subscales.

Table 12 contains the item-subscale and item-total scale correlations for the 21 items which might form subscales. Since Factor VIII was well defined in terms of the number of items loading on it, it was decided to delete items 68, 69, and 76 which had the lowest item-subscale correlations. For the remaining 18 items, all item-total subscale correlations except one and all item-total scale correlations fell within the 0.30 to 0.80 range suggested by Guilford.

The coefficient alpha for this scale of 18 items was calculated to be 0.900.

Table 12

Item-Subscale and Item-Total Scale Correlations--Uniformity of Practice (N=99)

Item	Instructional Materials	Instructional Process	Evaluation	Student Control	Total Scale
60	.436				.507
61	.699				.573
62	.707				.490
63	.686				.561
64	.656				.437
65	.600				.428
68		.417			.552
69		.469			.560
71		.524			.600
72		.488			.597
76		.426			.692
78		.493			.700
79		.638			.652
80		.506			.652
81			.656		.706
82			.847		.716
83			.746		.689
84			.670		.603
87				.745	.530
88				.780	.565
90				.565	.570

Subscales Proposed for Part III--Uniformity of Practice

The four subscales which were proposed as measures of the underlying dimensions of "uniformity of practice" were:

I. UNIFORMITY OF PRACTICE IN THE TYPE AND USE OF INSTRUCTIONAL MATERIALS

How Uniform Are Practices Regarding

60. The textbooks which are used.
61. The way in which textbooks are used.
62. The instructional materials other than textbooks which are used.
63. The ways in which these other instructional materials are used.
64. The types of A-V equipment which are used.
65. When various items of A-V equipment are used.

II. UNIFORMITY OF PRACTICE IN THE INSTRUCTIONAL PROCESS

How Uniform Are Practices Regarding

71. The pace at which content is to be covered by students.
72. When students are to move from one learning activity or unit to the next.
78. The specific teaching methods you use.
79. The methods of learning and problem solving used by the student.
80. The kinds of activities which accompany or follow the study of particular content.

III. UNIFORMITY OF STUDENT CONTROL PRACTICES

How Uniform Are Practices Regarding

87. The action which is taken when a student has been absent.

88. The action which is taken when a student is late for class.

90. The action which is taken in the event of a serious breach of the rules of conduct.

IV. UNIFORMITY OF PRACTICE IN EVALUATION

How Uniform Are Practices Regarding

81. Whether or not homework is assigned.

82. The methods of evaluation which are used.

83. The use which is made of the results of evaluation.

84. How often evaluation takes place.

Six of the seven categories of activities used in the conceptual framework were represented in the original 31 items. Of these, only the category "defining instructional objectives," which contained one item, was not represented in the 18 item subscale proposed here.

Other Changes in the Questionnaire

The major change in the form of the questionnaire which was used in the Pilot Study was the reduction in its length on the basis of the analysis of data just described. Two additional changes were made in revising the questionnaire.

The response categories used in Part II of the questionnaire--Change in Practice Over Time--appeared to be unreasonably precise and confining for respondents who were asked to describe what was "typically" the case. It was decided, therefore, to modify the categories to the following form:

A. VERY FREQUENTLY - An average of at least once a day

B. OFTEN - An average of at least once a week

C. OCCASIONALLY - An average of at least once a month

D. SELDOM - An average of at least once a year

E. NOT AT ALL DURING THE YEAR

Part IV was also revised to simplify response by teachers and to ask for only the information which was necessary for the final stage of the study.

SUMMARY

This chapter has described the procedures followed in the development and analysis of the questionnaire proposed as a measure of various aspects of the teaching-learning process. Based on the conceptualization presented in Chapter 2 and drawing on a number of sources for items, a three part questionnaire containing 110 items was constructed. Reactions from 28 persons who were either active teachers or were familiar with the activities being measured resulted in reducing the number of items to 90 and in changing the response categories of the section designed to measure the degree to which activities are programmed.

Ninety-nine teachers in nine schools with various grade combinations from I - XII responded to the 90 item questionnaire. On the basis of three criteria--construct validity, internal consistency of items, and practicality with respect to the length of the questionnaire--the data gathered were used to select items which comprised three scales of 18 items each. Three subscales were proposed for Scale I and four each for Scales II and III. Two other changes made were a modification of the response categories for Part II--Change in Practice Over Time--and some revision of Part IV which was designed to gather information about the teaching assignment.

Chapter 5

USE AND ANALYSIS OF THE FINAL FORM OF THE QUESTIONNAIRE

In its final form the questionnaire Descriptors of the Teaching-Learning Process was administered to a new sample of teachers. Information gathered from this administration was used to provide evidence as to the nature of the underlying dimensions of the teaching-learning process and indication of the reliability of the measures obtained. In addition, the data were used to explore something of the nature of the teaching-learning process as it occurs in particular schools, types of schools, and subject area specializations.

This chapter provides a description of the sample used, the administration of the questionnaire, and the analysis of the data by procedures of factor analysis, item analysis, and other estimates of reliability.

SAMPLE, ADMINISTRATION, AND SCORING

This form of the questionnaire was administered to teachers in 13 schools in the Edmonton Public School System. The schools constituted a stratified random sample of six elementary schools, four junior high schools, and three senior high schools. In all except one senior high school questionnaires were provided to all teachers engaged in full-time teaching. Since the number of teachers in this one senior high school was large, a random sample of 50 teachers was used. A total of 340 questionnaires was distributed; 87 to teachers in elementary schools, 101 to teachers in junior high schools, and 152 to teachers in senior high schools. Completed questionnaires were returned by 72 elementary school teachers, 82 junior high school teachers, and 93 senior high school teachers for a total of 247 which represented a 72.6 percent return. Five returns from senior high school teachers were incomplete and were not usable.

Table 13 presents the distribution of teachers in the sample by type of school in which they taught. Although not directly comparable with the sample used in the Pilot Study because of different grade level organization in the schools, the samples appear to be similar on the basis of grade level representation.

Table 13

Distribution of Teachers by Type of School

Type of School	Number of Questionnaires Distributed	Number of Usable Questionnaires Returned	Percent Usable Questionnaires Returned
Elementary	87	72	29.1
Junior High	101	82	33.1
Senior High	152	93	37.6
Total	340	247	99.8

Table 14 shows the distribution of the sample of junior and senior high school teachers by subject area specialization. Especially in the major subject areas (English-Social Studies and Mathematics-Science) this sample and that used in the Pilot Study are quite similar in distribution.

As in the Pilot Study, the questionnaires were distributed to teachers with a request that they be completed, sealed in the envelope provided, and returned to the school office within one week. In schools where all questionnaires were not returned within this time period, a reminder was sent to all teachers and 19 additional responses were received.

The scoring procedure used was the same as that described for the Pilot Study.

ANALYSIS OF DATA FOR PART I-- LOCUS OF DECISION

Factor Analysis

In preparation for a common-factor analysis of the 18 x 18 R matrix of variables a principal component analysis was performed. The 18 eigenvalues were subjected to a scree test which suggested five factors. A maximum-likelihood factor analysis was performed on the R matrix and the goodness-of-fit test was performed on the partially-converged solution. The chi square value of 125.31 (df = 60) was well beyond statistical significance ($p = .00$) indicating that the data were under-

Table 14

Distribution of Junior and Senior High School Teachers by Subject Area Specialization

Subject Area	Number	Percent
English-Social Studies	48	28.7
French-Foreign Languages	10	5.9
Mathematics-Science	57	34.1
Creative Arts	6	3.5
Physical Education	8	4.7
Home Economics	10	5.9
Industrial Arts	8	4.7
Business Education	10	5.9
Vocational Education	10	5.9
Total	167*	99.3

*Eight teachers did not respond to this item factored. The maximum-likelihood procedure was used for six factors and, though full convergence was not achieved, a partially-converged solution yielded a chi square value of 81.54 (df = 60) which fell below statistical significance (p = .06) suggesting that it was appropriate to accept the hypothesis of six factors. Because the maximum-likelihood procedure failed to reach a converged solution, an unweighted least squares solution, using the hypothesis of six factors, was obtained and subjected to a Harris-Kaiser oblique transformation, the A'A proportional to L version providing the clearest primary-factor pattern matrix. This matrix with Factors I, IV, and VI reflected is presented in Table 15. The primary-factor structure matrices for Parts I, II and III are presented in Appendix C.

It was not surprising that the factors derived from the data gathered in this administration of the revised questionnaire did not exactly duplicate the scales proposed for Part I on the basis of the factor analysis of data from the Pilot Study. Rummel (1970: 355) notes that since any significance test is dependent on sample size the use of a statistical test for the number of factors to retain will usually result in a larger number of factors with a larger sample. However, an examination of the factors as defined by items with loadings $\geq$ .300 revealed that there were no great inconsistencies with the subscales proposed earlier.

Table 15

Oblique Primary-Factor Pattern Matrix--
Locus of Decision
(N=247)

Item	Factors					
	I	II	III	IV	V	VI
1	-061*	452	174	-059	133	-087
2	097	613	008	065	-050	132
3	024	471	-150	185	164	067
4	-012	241	000	-068	022	596
5	020	-058	055	108	065	459
6	068	150	004	098	403	102
7	005	014	012	011	810	065
8	080	043	104	280	383	-159
9	028	203	-080	412	045	-155
10	000	-007	-156	471	061	083
11	-063	042	149	485	027	043
12	079	014	113	561	051	-006
13	123	002	151	458	075	052
14	954	-037	037	101	-005	-024
15	642	074	072	033	101	027
16	044	-050	682	022	091	090
17	027	196	633	051	013	-159
18	084	-090	429	209	-038	168

*Decimals have been omitted

These subscales consisted of 6 items each in successive groupings (1 - 6, 7 - 12, 13 - 18). Table 16 shows the comparison of the subscale composition as proposed on the basis of the Pilot Study with that proposed on the basis of the analysis of data from the administration of the final form of the questionnaire. When items 6 and 13 were shifted to subscale III, the six factor solution for this new set of data divided each of the three earlier subscales in two. It might be that such a solution does not reveal the existence of new underlying dimensions of "locus of decision" about the teaching-learning process but rather a more refined description of those suggested by the earlier analysis.

These restructured subscales with an identification of the dimension of "locus of decision" which they appear to measure are as follows:

I. CONTROL OF STUDENT PROMOTION

Who Decides

14. The basis on which students are to be promoted.
15. When students are to be promoted.

II. CONTROL OF INSTRUCTIONAL MATERIALS

Who Decides

1. The way in which textbooks are used.
2. What instructional materials other than textbooks are used.
3. The way in which these other instructional

Table 16

Subscales Proposed for Locus of Decision from the Pilot Study and from the Use of the Final Form of the Questionnaire

	Item	Subscale Proposed in the Pilot Study	Subscale Proposed in Use of Final Form
1.	The way in which textbooks are used	II	II
2.	What instructional materials other than textbooks are used	II	II
3.	The way in which these other instructional materials are used	II	II
4.	The types of A-V equipment which are used	II	IV
5.	When various items of A-V equipment are used	II	IV
6.	When particular units or topics are dealt with	II	V
7.	The pace at which content is to be covered by students	III	V
8.	What is to be achieved by the activities of students in the class setting	III	V
9.	The nature of your role as a teacher in particular teaching-learning situations	III	IV
10.	The specific teaching methods you use	III	IV
11.	Whether or not homework is assigned	III	IV
12.	The methods of evaluation which are used	III	IV
13.	The use which is made of the results of evaluation	I	IV
14.	The basis on which students are to be promoted	I	I
15.	When students are to be promoted	I	I
16.	What action is taken when a student has been absent from class	I	III
17.	What action is taken when a student comes to class late	I	III
18.	What action is taken in the event of a serious breach of the rules of conduct	I	III

materials are used.

III. CONTROL OF STUDENTS

Who Decides

16. What action is taken when a student has been absent from class.
17. What action is taken when a student comes to class late.
18. What action is taken in the event of a serious breach of the rules of conduct.

IV. CONTROL OF INSTRUCTION AND EVALUATION

Who Decides

9. The nature of your role as a teacher in particular teaching-learning situations.
10. The specific teaching methods you use.
11. Whether or not homework is assigned.
12. The methods of evaluation which are used.
13. The use which is made of the results of evaluation.

V. CONTROL OF OBJECTIVES AND SEQUENCING

Who Decides

6. When particular units or topics are dealt with.
7. The pace at which content is to be covered by students.
8. What is to be achieved by the activities of students in the class setting.

VI. CONTROL OF A-V EQUIPMENT

Who Decides

4. The types of A-V equipment which are used.
5. When various items of A-V equipment are used.

Reliability Estimates

Both for the purpose of establishing the contribution of an item to the total scale and to its subscale, as well as being some indication of the internal consistency of the scale and its subscales, item-factor and item-total scale correlations were examined and are reported in Table 17. In terms of Guilford's suggested range of correlations which would optimize both the validity and the reliability of a scale, all item-factor correlations except two and all item-total correlations except one fell within the 0.30 to 0.80 range.

The coefficient alpha was calculated for each subscale and for the total scale. The coefficients for the subscales were 0.538, 0.479, 0.611, 0.636, 0.801, and 0.638, and that for the total scale was 0.770. All except that for subscale II satisfied the range 0.50 to 0.60 suggested by Nunnally (1967:226) as being acceptable.

ANALYSIS OF DATA FOR PART II--CHANGE IN PRACTICE OVER TIME

Factor Analysis

Again two analyses were performed. First, the 18 x 18 R matrix was subjected to a principal component

Table 17

Item-Factor and Item-Total Scale Correlations--Locus of Decision
(N=247)

Item	Student Promotion	Inst. Materials	Student Control	Inst. & Evaluation	Objectives & Sequencing	A-V Equipment	Total Scale
14	.995						.480
15	.673						.493
1		.465					.377
2		.638					.440
3		.540					.445
16			.701				.441
17			.654				.449
18			.475				.419
9				.443			.420
10				.460			.351
11				.517			.462
12				.612			.546
13				.532			.554
6					.476		.512
7					.823		.528
8					.470		.556
4						.628	.278
5						.463	.303

analysis and a scree test was performed on the 18 eigenvalues which suggested four factors. Next, the maximum-likelihood factor analysis procedure was applied and the hypotheses of four and five factors were rejected as a result of the goodness-of-fit tests performed on the partially-converged solutions. With six factors, iteration to a converged solution produced a chi square of 70.92 (df = 60) which fell below statistical significance (p = .16) indicating that six factors provided an acceptable fit to the data. In this instance, too, the Harris-Kaiser oblique transformation *A'A proportional to L* version provided the clearest primary-factor pattern. This matrix with Factors I and III reflected is shown in Table 18.

A comparison of the factors defined by items loading $\geq$.300 as shown in Table 18 with those subscales proposed on the basis of the earlier factor analysis showed that, with some slight shifts of items, the chief difference was again in the division of two of the earlier subscales into two each (Table 19). Three items loaded on two factors each, creating something of an overlap. Item 3 loaded on Factors II and VI, item 5 loaded on Factors V and VI, and item 16 loaded on Factors I and IV. Such a situation should not be surprising especially when an oblique transformation is used; however, it did create some difficulty when an attempt was made to identify the dimensions being measured by the factors.

The six subscales of "change in practice over

Table 18

Oblique Primary-Factor Pattern Matrix--Change in Practice Over Time (N=247)

	Factors					
Item	I	II	III	IV	V	VI
1	115*	523	141	064	035	-019
2	-027	819	022	-024	057	163
3	030	516	093	040	-018	441
4	022	145	020	039	198	474
5	051	-032	159	-026	412	332
6	125	-004	402	211	126	216
7	079	168	499	018	286	-199
8	-001	205	727	045	078	-109
9	121	036	764	-012	020	128
10	108	010	553	018	090	299
11	049	056	175	-019	447	077
12	012	059	181	011	450	-032
13	017	022	-013	234	489	018
14	041	006	-065	076	627	185
15	959	035	024	043	029	-009
16	714	-050	080	307	-064	131
17	120	059	131	668	024	026
18	106	064	-075	666	203	-039

*Decimals have been omitted

Table 19

Subscales Proposed for Change in Practice Over Time from the Pilot Study and from the Use of the Final Form of the Questionnaire

	Item	Subscale Proposed in the Pilot Study	Subscale Proposed in Use of Final Form
1.	The way in which textbooks are used	IV	II
2.	The instructional materials other than textbooks which are used	IV	II
3.	The way in which these other instructional materials are used	IV	II & VI
4.	The types of A-V equipment which are used	IV	VI
5.	Who uses various items of A-V equipment in your class(es)	I	V & VI
6.	The instructional objectives to be achieved by student activities	I	III
7.	The nature of your role as a teacher in particular teaching-learning situations	I	III
8.	The specific teaching methods you use	I	III
9.	The methods of learning and problem solving used by the student	I	III
10.	The kinds of activities which accompany or follow the study of particular content	I	III
11.	The location where various learning activities are carried on, whether in a single classroom, a variety of different areas in the school, or various places outside the school	III	V
12.	The extent to which students are permitted to move around in their learning environment	III	V
13.	The amount of time which is allocated to the specific subject(s) which you teach	III	V
14.	The amount of unstructured time during which students are permitted to pursue their own interests	III	V
15.	The action you take when a student has been absent from class	II	I
16.	The action you take when a student comes to class late	II	I & IV
17.	Rules for student conduct while engaged in class related activities	II	IV
18.	The action which you take in the event of a serious breach of the rules of conduct	II	IV

time" with an identification of what each appears to measure are as follows:

I. CHANGE IN REGULATION OF STUDENT ATTENDANCE

How Often Is There Change In

15. The action you take when a student has been absent from class.
16. The action you take when a student comes to class late.

II. CHANGE IN SELECTION AND USE OF INSTRUCTIONAL MATERIALS

How Often Is There Change In

1. The way in which textbooks are used.
2. The instructional materials other than textbooks which are used.
3. The way in which these other instructional materials are used.

III. CHANGE IN THE INSTRUCTIONAL PROCESS

How Often Is There Change In

6. The instructional objectives to be achieved by student activities.
7. The nature of your role as a teacher in particular teaching-learning situations.
8. The specific teaching methods you use.
9. The methods of learning and problem solving used by the student.
10. The kinds of activities which accompany or

follow the study of particular content.

IV. CHANGE IN CONTROL OF STUDENT CONDUCT

How Often Is There Change In

16. The action you take when a student comes to class late.
17. Rules for student conduct while engaged in class related activities.
18. The action which you take in the event of a serious breach of the rules of conduct.

V. CHANGE IN THE USE OF SPACE AND TIME

How Often Is There Change In

5. Who uses various items of A-V equipment in your class(es).
11. The location where various learning activities are carried on, whether in a single classroom, a variety of different areas in the school, or various places in the community.
12. The extent to which students are permitted to move around in their learning environment.
13. The amount of time which is allocated to the specific subject(s) which you teach.
14. The amount of unstructured time during which students are permitted to pursue their own interests.

VI. CHANGE IN A-V EQUIPMENT AND ITS USE

How Often Is There Change In

3. The way in which these other instructional materials are used.
4. The types of A-V equipment which are used.
5. Who uses various items of A-V equipment in your class(es).

Reliability Estimates

Item-factor and item-total scale correlations were calculated for the items in Change in Practice Over Time and are shown in Table 20. Four of the item-factor correlations exceeded the 0.30 to 0.80 range suggesting that greater reliability might have been achieved at the expense of validity. However, for the total scale all the correlations were within the 0.30 to 0.80 range.

The coefficient alpha for each of the subscales was in excess of the minimum range of 0.50 to 0.60 which was suggested by Nunnally as was also that for the total scale. The subscale coefficients were 0.787, 0.686, 0.827, 0.721, 0.904, and 0.782, and the coefficient for the total scale was 0.884.

ANALYSIS OF DATA FOR PART III--UNIFORMITY OF PRACTICE

Factor Analysis

A principal component analysis was first performed on the 18 x 18 $\underline{R}$ matrix of variables for Part III of the questionnaire. The scree test applied to the 18 eigenvalues was not helpful in determining the number of factors

Table 20

Item-Factor and Item-Total Scale Correlations--Change in Practice Over Time (N=247)

Item	Student Attendance	Inst. Materials	Inst. Process	Student Conduct	Space & Time	A-V Equipment	Total Scale
15	.995						.576
16	.813			.582			.596
1		.583					.535
2		.897					.556
3		.733				.679	.587
6			.538				.660
7			.588				.609
8			.777				.619
9			.825				.645
10			.668				.646
17				.751			.598
18				.762			.542
11					.532		.560
12					.510		.523
13					.570		.557
14					.690		.578
4						.593	.528
5					.538	.451	.570

to extract. The maximum-likelihood procedure was used to obtain a partially-converged solution for five factors but the goodness-of-fit test applied indicated that this hypothesis be rejected. For six factors the maximum-likelihood procedure was again applied and, though full convergence was not achieved, the partially-converged solution yielded a chi square value of 79.69 (df = 60) which fell below statistical significance (p = .09) and it was accepted that six factors were appropriate. An unweighted least squares solution was obtained for six factors and was subjected to a Harris-Kaiser oblique transformation, this time the independent cluster version. The resulting primary-factor pattern matrix, with Factors I, II, IV, and V reflected, is given in Table 21.

An examination of the factor pattern revealed that a similar phenomenon had occurred as in the analysis for Parts I and II. As shown in Table 22,two of the four subscales proposed on the basis of the earlier analysis had split (Subscales I and II), one remained as it was (Subscale IV), while Subscale III was extended with item 1 loading on it and to a lesser extent item 2. These two items, along with item 12, loaded on two factors (I and IV) although not to the .300 level in each case. This indicated that they were measuring more than a single dimension. Items 1 and 2 dealt with uniformity of practice regarding textbooks and the way in which they were used; item 12 dealt with whether or not homework

Table 21

Oblique Primary-Factor Pattern Matrix--
Uniformity of Practice
(N=247)

	Factors					
Item	I	II	III	IV	V	VI
1	333*	-062	066	414	066	-035
2	279	-117	086	274	172	076
3	-021	008	-035	-025	1103	-027
4	033	034	044	-027	796	036
5	051	010	676	-004	074	061
6	-051	002	932	024	-060	-055
7	577	032	-067	-002	023	254
8	1156	020	-028	-174	-065	-204
9	045	-019	-018	-021	-081	862
10	-056	049	-036	-064	007	742
11	122	-023	067	083	070	463
12	256	004	072	271	-038	085
13	-033	-002	-082	823	038	-017
14	-075	-005	-126	909	013	-063
15	014	098	127	616	-126	054
16	060	913	-023	037	-049	-029
17	043	964	-009	-056	-006	-030
18	-110	740	036	042	069	055

*Decimals have been omitted

Table 22

Subscales Proposed for Uniformity of Practice from the Pilot Study and from the Use of the Final Form of the Questionnaire

Item	Subscale Proposed in the Pilot Study	Subscale Proposed in Use of Final Form
1. The textbooks which are used	I	I & IV
2. The way in which textbooks are used	I	I & IV
3. The instructional materials other than textbooks which are used	I	V
4. The way in which these other instructional materials are used	I	V
5. The types of A-V equipment which are used	I	III
6. When various items of A-V equipment are used	I	III
7. The pace at which content is to be covered by students	II	I
8. When students are to move from one learning activity or unit to the next	II	I
9. The specific teaching methods you use	II	VI
10. The methods of learning and problem solving used by the student	II	VI
11. The kinds of activities which accompany or follow the study of particular content	II	VI
12. Whether or not homework is assigned	III	I & IV
13. The methods of evaluation which are used	III	IV
14. The use which is made of the results of evaluation	III	IV
15. How often evaluation takes place	III	IV
16. The action which is taken when a student has been absent	IV	II
17. The action which is taken when a student is late for class	IV	II
18. The action which is taken in the event of a serious breach of the rules of conduct	IV	II

was assigned. All three items were associated with items 7 and 8 in Factor I which, since the Factor had high loadings on these two items suggested that it was concerned with pacing and sequencing of student learning. The fact that items dealing with textbooks and their use was associated with pacing and sequencing is not surprising since it suggests that pacing and sequencing might in some measure be determined by the textbooks which are used and how they are used. The assignment of homework is often used to enable students to keep pace with others in the class which might explain the loading of item 12 on this Factor. The same three items (1, 2, and 12) also loaded with items 13, 14, and 15 which dealt with evaluation and defined Factor IV. Again it was not difficult to see why this was so, especially for items 1 and 2 since it suggests the close relationship between textbooks used, the manner of their use, and evaluation practices. The association of item 12 with this Factor might result from the practice of having home assignments examined and/or marked for the purpose of evaluating student performance.

The six subscales suggested as measures of underlying dimensions of "uniformity of practice" as a result of the factor analysis just discussed are as follows:

I. UNIFORMITY IN THE PACE OF STUDENT LEARNING

How Uniform Are Practices Regarding

1. The textbooks which are used.
2. The way in which textbooks are used.
7. The pace at which content is to be covered by students.
8. When students are to move from one learning activity or unit to the next.
12. Whether or not homework is assigned.

II. UNIFORMITY OF STUDENT CONTROL PRACTICES

How Uniform Are Practices Regarding

16. The action which is taken when a student has been absent.
17. The action which is taken when a student is late for class.
18. The action which is taken in the event of a serious breach of the rules of conduct.

III. UNIFORMITY IN THE TYPE AND USE OF A-V EQUIPMENT

How Uniform Are Practices Regarding

5. The types of A-V equipment which are used.
6. When various items of A-V equipment are used.

IV. UNIFORMITY IN EVALUATION

How Uniform Are Practices Regarding

1. The textbooks which are used.
2. The way in which textbooks are used.
12. Whether or not homework is assigned.
13. The methods of evaluation which are used.
14. The use which is made of the results of

evaluation.

15. How often evaluation takes place.

V. UNIFORMITY IN THE TYPE AND USE OF INSTRUCTIONAL MATERIALS

How Uniform Are Practices Regarding

3. The instructional materials other than textbooks which are used.
4. The way in which these other instructional materials are used.

VI. UNIFORMITY IN THE INSTRUCTIONAL PROCESS

How Uniform Are Practices Regarding

9. The specific teaching methods you use.
10. The methods of learning and problem solving used by the student.
11. The kinds of activities which accompany or follow the study of particular content.

Reliability Estimates

Table 23 presents the item-factor and item-total scale correlations for Uniformity of Practice. With reference to Guilford's suggestion, seven of the item-factor correlations exceeded the 0.30 to 0.80 range indicating a tendency to favor reliability rather than validity. The item-total scale correlations were all within the 0.30 to 0.80 range.

The coefficient alpha for each of the six subscales was in excess of the 0.50 to 0.60 range.

Table 23

Item-Factor and Item-Total Scale Correlations--Uniformity of Practice
(N=247)

Item	Pace of Learning	Student Control	A-V Equipment	Student Evaluation	Inst. Materials	Inst. Process	Total Scale
1	.603			.622			.650
2	.603			.560			.626
7	.747						.646
8	.869						.501
12	.479			.472			.553
16		.918					.543
17		.936					.514
18		.774					.532
5			.743				.459
6			.879				.314
13				.789			.682
14				.795			.651
15				.662			.632
3					.973		.684
4					.846		.671
9						.821	.613
10						.670	.528
11						.655	.616

The coefficients for the subscales were 0.792, 0.902, 0.782, 0.749, 0.815, and 0.905, and that for the total scale was 0.881.

SUMMARY

The revised form of Descriptors of the Teaching-Learning Process was administered to 247 teachers from a stratified random sample of six elementary schools, four junior high schools, and three senior high schools in the Edmonton Public School System. The results of the common-factor analysis performed on the data indicated that each of the three scales formed six subscales. These subscales differed from those proposed on the basis of the earlier analysis primarily in the tendency for the earlier subscales to divide in two. Reliability estimates in terms of item-subscale and item-total scale correlations appeared to be acceptable. Except for Subscale II of Locus of Decision the coefficient alpha for the subscales and for the total scales exceeded the minimum range of 0.50 to 0.60 suggested by Nunnally as being acceptable for basic research. Summary information for the three scales and the eighteen subscales is presented in Table 24.

Table 24

Summary Information for Scales and Subscales of the Final Form of Descriptors of the Teaching-Learning Process

Scale	No. of Items	Range of Item-Scale Correlations	Coeff. Alpha	Subscales	Items	Coeff. Alpha
Locus of Decision	18	0.278 - 0.556	0.770	Student Promotion	14,15	0.538
				Instructional Materials	1,2,3	0.479
				Control of Students	16,17,18	0.611
				Instruction & Evaluation	9,10,11,12,13	0.636
				Objectives & Sequencing	6,7,8	0.801
				A-V Equipment	4,5	0.638
Change in Practice Over Time	18	0.523 - 0.660	0.884	Regulation of Student Attendance	15,16	0.787
				Selection & Use of Instructional Materials	1,2,3	0.686
				The Instructional Process	6,7,8,9,10	0.827
				Control of Student Conduct	16,17,18	0.721
				Use of Space & Time	5,11,12,13,14	0.904
				A-V Equipment & Its Use	3,4,5	0.782
Uniformity of Practice	18	0.314 - 0.684	0.881	Pace of Student Learning	1,2,7,8,12	0.792
				Student Control	16,17,18	0.903
				Type & Use of A-V Equipment	5,6	0.782
				Evaluation	1,2,12,13,14,15	0.749
				Type & Use of Instructional Materials	3,4	0.815
				The Instructional Process	9,10,11	0.905

Chapter 6

THE TEACHING-LEARNING PROCESS AND SCHOOL VARIABLES

The final form of *Descriptors of the Teaching-Learning Process* was administered to the sample of 247 teachers for two purposes. As was described in the previous chapter, one of these purposes was to provide further information regarding the nature of the underlying dimensions of the teaching-learning process and the reliability of the data gathered by use of the questionnaire. A second purpose was to explore what differences, if any, existed between teachers' perceptions of the various aspects of the teaching-learning process in different schools, in different type schools, and in different subject area specializations. A documentation of such differences would be one way to describe the teaching-learning process as it occurs in various situations. This chapter presents a description and discussion of differences among the various classifications of teachers based on one-way analysis of variance and, where appropriate, multiple comparison procedures. Since this aspect of the study was exploratory, no research hypotheses were formulated and findings are only reported where a significance level $< .05$ was reached.

LOCUS OF DECISION

As described earlier, the responses of teachers to Part I--Locus of Decision--were based on a five-point scale. In terms of this scale the decisions regarding various practices are made by a(n):

5. Outside source
4. Outside source and teacher
3. Teacher
2. Teacher and student(s)
1. Student

Scores for each item ranged from 1 to 5 with the higher scores indicating that decisions were further removed from the student. The possible range of scores was from 18 to 90. The underlying dimensions of Locus of Decision defined by the six subscales are presented as factor scores with a mean of 50 and a standard deviation of 10.

Type of School

The teachers comprising the sample used in this part of the study were from three different types of schools--elementary schools (grades K - VI), junior high schools (grades VII - IX), and senior high schools (grades X - XII). Such a classification of respondents was used to determine if differences in perceptions of the teaching-learning process existed.

An analysis of variance of the total scores of teachers on Locus of Decision revealed that no significant differences existed in these scores in different type schools. However, when a similar analysis was performed on the factor scores for the six dimensions of Locus of Decision using type of school as a predictor, scores of teachers were significantly different on Control of Student Promotion, Control of Instructional Materials, and Control of A-V Equipment (Table 25). Using the Scheffé test to compare the mean scores for the three groups on these three factors, it was shown that significant differences existed between the mean scores for junior high school teachers and those for senior high school teachers on Control of Student Promotion and Control of Instructional Materials. The mean scores for junior high teachers were higher on both of these dimensions indicating a tendency for these teachers to perceive decisions to be further removed from students than was so for senior high teachers. This does not necessarily mean that in senior high schools there is a tendency for students to make decisions regarding these two areas, since the same phenomena might be described by saying that there is a tendency for decisions to be further removed from an outside source in senior high schools when compared with junior high schools. The point is that in this instance, as in all others that will be described in this chapter, the findings merely indicate the tendency for responses to locate in a

Table 25

Analysis of Variance of Factor Scores on Locus of Decision For Teachers in Three Types of Schools (N=247)

		Means					
Type of School	N	Student Promotion	Inst. Materials	Student Control	Inst. & Evaluation	Objectives & Sequencing	A-V Equipment
Elementary	72	50.27	50.64	48.47	51.67	50.28	47.60
Junior High	82	51.93	51.84	51.55	50.00	51.13	49.75
Senior High	93	50.00	47.89	49.81	48.71	48.79	52.08
MS_b		324.69	360.94	185.00	178.19	123.87	411.06
MS_w		98.57	98.27	99.71	99.76	100.21	97.86
F Ratios		3.29	3.67	1.86	1.79	1.24	4.20
p		.04	.03	.16	.17	.29	.02

particular direction on the continuum and not the precise location. On Control of A-V Equipment, the mean score for teachers in senior high schools was significantly higher than for teachers in elementary schools indicating that, with respect to this aspect of the teaching-learning process, senior high teachers perceived decisions to be further removed from the student than did elementary school teachers.

Schools Within Each Type

An analysis of variance of the total Locus of Decision scores of teachers in the six elementary schools in the sample indicated a significant difference between the scores of teachers in different schools. The Scheffé test revealed that the mean score of teachers in school 2 was significantly higher than that of teachers in school 6 (Table 26).

To determine more precisely in which area of process activity these differences existed, analyses of variance of scores on the six factors were performed. The data in Table 27 indicate that a significant difference existed between schools on Control of Students, and the Scheffé test again revealed that the mean score for teachers in school 2 was significantly higher than for teachers in school 6. At this stage, the nature of the differences may be less important than the fact that the instrument is able to detect such differences.

Table 26

Analysis of Variance of Scores on Locus of Decision for Teachers in Six Elementary Schools
(N=72)

School Number	N	Means	MS_b	MS_w	F	p
1	15	59.33	72.16	20.01	3.61	.01
2	18	61.33				
3	6	62.00				
4	12	56.92				
5	13	58.08				
6	8	54.75				

Table 27

Analysis of Variance of Factor Scores on Locus of Decision for Teachers in Six Elementary Schools

(N=72)

		Means					
School Number	N	Student Promotion	Inst. Materials	Student Control	Inst. & Evaluation	Objectives & Sequencing	A-V Equipment
1	15	48.73	50.47	47.47	53.16	51.92	47.56
2	18	51.64	51.41	53.73	55.97	52.33	47.49
3	6	54.85	57.08	50.38	55.87	49.20	53.64
4	12	49.64	45.75	47.95	47.26	51.41	45.16
5	13	49.44	50.16	48.84	49.59	46.35	49.45
6	8	48.94	52.50	37.24	46.05	48.09	43.82
MS_b		44.63	115.49	309.61	203.10	75.57	89.85
MS_w		77.66	82.95	82.18	105.82	80.65	61.44
F Ratios		0.57	1.39	3.77	1.92	0.94	1.46
p		.72	.24	.01	.10	.46	.21

When the total scores and factor scores of teachers in junior and senior high schools were analyzed in a similar manner, no significant differences were found.

Subject Area Specialization

Part IV of the questionnaire requested teachers to provide information regarding the subject area in which they specialized, defined as that in which they spent more than half of their teaching time. Since, by this definition, few elementary school teachers specialized, this section is concerned with differences between scores in different subject area specializations as evident from the responses of junior and senior high school teachers only. Also, since a number of subjects were represented by very few respondents, some of the categories were excluded from this analysis and other categories were collapsed. This was done on what appeared to be a logical basis by combining the French-Foreign Languages group with the English-Social Studies group and combining Home Economics, Industrial Arts, Business Education, and Vocational Education. This latter grouping would appear to be not unreasonable in view of the fact that all of these subjects have in common a concern with practical arts or the development of manual skills and also, the mean scores for these subjects appeared to be not markedly different. To facilitate discussion of results the three subject areas will be referred to as Language-Social Subjects, Mathematics-Science Subjects, and Practical Subjects.

A one-way analysis of variance of total Locus of Decision scores for 153 junior and senior high school teachers combined was performed using subject area specialization as a predictor. The evidence from Table 28 shows that the scores of teachers in different subject areas were significantly different. The Scheffé test indicated that the mean score for teachers in the Mathematics-Science Subjects was significantly higher than that for either of the other two groups. When a similar analysis was carried out on the six sets of factor scores for Locus of Decision, the results revealed that scores of teachers in the three groups were significantly different on all except Factor IV--Control of A-V Equipment (Table 29). The Scheffé test showed that on Control of Student Promotion and Control of Instructional Materials the means for Mathematics-Science teachers were significantly higher than those for teachers in the Practical Subjects. On Control of Students and Control of Objectives and Sequencing the mean scores for Mathematics-Science teachers were significantly higher than for either of the other two groups. On Control of Instruction and Evaluation, the mean score for teachers in Mathematics-Science was significantly higher than that for teachers in the Language-Social Subjects.

Table 28

Analysis of Variance of Scores on Locus of Decision for Junior and Senior High School Teachers Classified by Subject Area Specialization

(N=153)

Subject Area	N	Means	MS_b	MS_w	F	p
English-Social, Foreign Languages	58	57.69	345.38	31.14	11.09	.00
Mathematics-Science	57	61.79				
Home Economics, Industrial Arts, Business Education, Vocational Education	38	57.03				

Table 29

Analysis of Variance of Factor Scores on Locus of Decision for Junior and Senior High School Teachers Classified by Subject Area Specialization
(N=153)

Subject Area	N	Means					
		Student Promotion	Inst. Materials	Student Control	Inst. & Evaluation	Objectives & Sequencing	A-V Equipment
English-Social, Foreign Languages	58	48.77	49.43	48.99	47.76	47.20	52.58
Mathematics-Science	57	52.26	52.78	53.61	52.38	55.59	49.67
Home Economics, Industrial Arts, Business Education, Vocational Education	38	47.00	46.60	48.45	49.00	46.05	51.95
MS_b MS_w		350.47 95.47	448.72 106.08	421.75 92.04	322.66 89.84	1414.66 89.95	131.78 117.63
F Ratios		3.67	4.23	4.58	3.59	15.73	1.12
p		.03	.02	.01	.03	.00	.33

Since, as was reported earlier, some differences existed in the mean scores of respondents when classified by type of school, some of the differences just reported for different subject area specializations might be attributable to type of school. Therefore, the responses for junior and senior high schools were analyzed separately.

Table 30 indicates that the total Locus of Decision scores of junior high school teachers were significantly different for different subject area specializations. The Scheffé test showed that the mean score for Mathematics-Science teachers was significantly higher than the mean for teachers in the Practical Subjects. When factor scores were analyzed (Table 31), only the scores on Control of Objectives and Sequencing were significantly different and, again, the Scheffé test revealed that the mean score for Mathematics-Science teachers was significantly higher than the mean for teachers in the Practical Subjects.

Analysis of variance of the scores of senior high school teachers also showed that differences existed in different subject areas on the total Locus of Decision scores (Table 32). The Scheffé test indicated that the mean score for Mathematics-Science teachers was significantly higher than the means for teachers in Language-Social Subjects and for those in the Practical Subjects. Analyses of

Table 30

Analysis of Variance of Scores on Locus of Decision for Junior High School Teachers Classified by Subject Area Specialization (N=66)

Subject Area	N	Means	MS_b	MS_w	F	p
English-Social, Foreign Languages	31	60.19	73.53	22.27	3.30	.04
Mathematics-Science	23	61.65				
Home Economics, Industrial Arts, Business Education	12	57.33				

Table 31

Analysis of Variance of Factor Scores on Locus of Decision for
Junior High School Teachers Classified
by Subject Area Specialization
(N=66)

		Means					
Subject Area	N	Student Promotion	Inst. Materials	Student Control	Inst. & Evaluation	Objectives & Sequencing	A-V Equipment
English-Social, Foreign Languages	31	51.87	54.34	50.35	49.72	50.65	52.90
Mathematics-Science	23	52.59	53.22	53.97	52.81	55.23	46.25
Home Economics, Industrial Arts, Business Education	12	49.08	46.62	48.26	49.46	45.46	50.61
MS_b		50.44	264.69	151.00	75.28	388.62	294.06
MS_w		73.56	90.73	106.79	65.86	93.06	106.99
F Ratios		0.69	2.92	1.41	1.14	4.17	2.75
p		.51	.06	.25	.33	.02	.07

Table 32

Analysis of Variance of Scores on Locus of Decision for Senior High School Teachers Classified by Subject Area Specialization (N=87)

Subject Area	N	Means	MS_b	MS_w	F	p
English-Social, Foreign Language	27	54.81	407.91	33.91	12.02	.00
Mathematics-Science	34	61.88				
Home Economics, Industrial Arts, Business Education, Vocational Education	26	56.88				

variance on the factor scores showed that scores on Control of Student Promotion, Control of Instructional Materials, Control of Students, and Control of Objectives and Sequencing were all significantly different when classified by subject area specialization (Table 33). The Scheffé test again substantiated that the means for Mathematics-Science teachers were significantly higher in all of these areas than the means for teachers in Language-Social Subjects and, on Control of Objectives and Sequencing the mean for Mathematics-Science teachers was also higher than that for teachers in the Practical Subjects.

The consistency for teachers in the Mathematics-Science area to score higher than teachers in the other subject areas on so many dimensions of Locus of Decision suggests that there is something about this area or the way in which it is treated which is associated with such a trend. It might be that the Mathematics-Science Subjects are more structured and content oriented and teachers perceive less need for involvement of students in decisions related to the teaching-learning process. On the other hand, it might be that in these subjects many more decisions are made by sources outside the class setting so that teachers themselves are more confined and limited in the extent to which they can make decisions regarding such matters as promotion, instructional materials,

Table 33

Analysis of Variance of Factor Scores on Locus of Decision for Senior High School Teachers Classified by Subject Area Specialization (N=87)

		Means					
Subject Area	N	Student Promotion	Inst. Materials	Student Control	Inst. & Evaluation	Objectives & Sequencing	A-V Equipment
English-Social, Foreign Languages	27	45.22	43.82	47.42	45.51	43.24	52.21
Mathematics-Science	34	52.04	52.47	53.37	52.09	55.84	51.98
Home Economics, Industrial Arts, Business Education, Vocational Education	26	46.04	46.60	48.53	48.79	46.32	52.57
MS_b		431.00	602.28	310.34	327.00	1335.09	2.62
MS_w		106.77	102.38	82.74	107.87	81.26	124.00
F Ratios		4.04	5.88	3.75	3.03	16.43	0.02
p		.02	.00	.03	.05	.00	.98

student control, the instructional process, and objectives and sequencing. Furthermore, it is evident that senior high school teachers in the Mathematics-Science area scored higher than other teachers on more dimensions of Locus of Decision than was so for junior high school teachers. Such a tendency is not consistent with the finding reported earlier that junior high school teachers as a group scored higher than senior high school teachers on Control of Student Promotion and Control of Instructional Materials. This seems to provide further evidence that there is something about the Mathematics-Science Subject area which influences the tendency for teachers to score higher than other teachers quite apart from any other interacting influences.

CHANGE IN PRACTICE OVER TIME

Teachers were asked to respond to Part II of the questionnaire--Change in Practice Over Time--on a five-point scale to indicate whether the practices described by the items changed:

5. Very frequently
4. Often
3. Occasionally
2. Seldom
1. Not at all during the year.

Scores on each item ranged from 1 to 5 with the higher scores indicating more frequent change in practices. The total scores for Change in Practice Over Time might range from 18 to 90. Measures of the six dimensions of this scale were also represented by factor scores standardized to a mean of 50 and a standard deviation of 10.

Type of School

The total scores for teachers were subjected to an analysis of variance using type of school as a predictor. Table 34 shows that there was a significant difference in the scores obtained by teachers in different type schools. By the Scheffé method of multiple comparison it was found that the mean score for teachers in elementary schools was significantly higher than those for teachers in junior high schools and in senior high schools indicating a greater tendency for practices to change in elementary schools than in either of the other types.

In order to determine more specifically in which areas of the teaching-learning process these differences were most manifest, the factor scores for the six dimensions of Change in Practice Over Time were subjected to analyses of variance. Evidence from Table 35 indicates that significant differences existed on Regulation of Student Attendance and the Scheffé test revealed that the mean score for teachers in senior high schools was higher than that for teachers in junior high schools indicating more frequent change in

Table 34

Analysis of Variance of Scores on Change in Practice Over Time
for Teachers in Three Types of Schools
(N=247)

Type of School	N	Means	MS_b	MS_w	F	p
Elementary	72	58.11	836.09	108.08	7.74	.00
Junior High	82	51.55				
Senior High	93	54.01				

Table 35

Analysis of Variance of Factor Scores on Change in Practice Over Time for Teachers in Three Types of Schools
(N=247)

		Means					
Type of School	N	Student Attendance	Inst. Materials	Inst. Process	Student Conduct	Space & Time	A-V Equipment
Elementary	72	48.66	51.68	49.94	52.34	56.06	53.33
Junior High	82	48.51	48.96	49.64	48.51	46.13	49.36
Senior High	93	50.00	49.62	50.37	49.50	48.74	47.99
MS_b		411.63	152.84	11.97	299.03	2002.53	605.50
MS_w		97.86	99.98	101.13	98.78	84.81	96.26
F Ratios		4.21	1.53	0.12	3.03	23.61	6.29
p		.02	.22	.89	.05	.00	.00

senior high schools. Scores on Change in the Use of Space and Time and Change in A-V Equipment and Its Use were also significantly different by type of school. In these areas the differences in mean scores were consistent with those for total scores in that the Scheffé test showed that the means for elementary school teachers were significantly higher than for junior and senior high teachers.

These findings indicate that, whereas senior high school teachers reported greater frequency of change in practices related to Regulation of Student Attendance than junior high school teachers, for Change in Practice as a whole, and for change in practices related to Use of Space and Time and Type of A-V Equipment and Its Use, elementary teachers reported more frequent change than did junior or senior high school teachers. It might be reasoned that one would expect practices regarding Regulation of Student Attendance to be less programmed at the senior high school level considering that many students at this level are beyond the compulsory school attendance age and that at such an age a greater variety of reasons for non-attendance might be encountered. However, by this argument senior high teachers should have scored significantly higher than elementary school teachers as well. It is not surprising either that elementary teachers reported more frequent change in practices related to Use of Space and Time and Type of A-V Equipment and Its Use since elementary schools have smaller enrolments, fewer teachers, and generally, the possibility of greater flexibility in these matters since the need for complex organization can more easily be avoided.

Schools Within Each Type

The data for the teachers in the six elementary schools, the four junior high schools, and the three senior high schools were analyzed separately to determine if differences existed among individual schools of the same type. No significant differences were found among the elementary schools or the junior high schools on either the total scores or the factor scores. The scores of senior high school teachers on Regulation of Student Attendance, and Control of Student Conduct were significantly different in the different schools (Table 36). In each case the Scheffé test showed that the mean score for teachers in school 13 was significantly higher than that for teachers in school 12 indicating a greater tendency for these practices to change in school 13.

Subject Area Specialization

As was done in the analysis of teacher scores on Locus of Decision, the total scores and the factor scores for Change in Practice Over Time were analyzed

Table 36

Analysis of Variance of Factor Scores on Change in Practice Over Time for Teachers in Three Senior High Schools

(N=93)

		Means					
School Number	N	Student Attendance	Inst. Materials	Inst. Process	Student Control	Space & Time	A-V Equipment
11	27	51.66	51.43	51.04	50.35	49.35	49.89
12	31	48.88	49.24	48.08	45.32	46.68	47.08
13	35	55.96	48.57	51.87	52.54	50.09	47.32
MS_b		421.19	65.81	126.47	442.16	102.78	69.44
MS_w		101.93	104.70	125.75	93.26	88.06	113.14
F Ratios		4.13	0.63	1.01	4.74	1.17	0.61
p		.02	.54	.37	.01	.32	.54

for junior and senior high school teachers (in combination and separately) when classified by three subject area specializations. Although total scores of junior and senior high school teachers on Change in Practice Over Time were not shown to be significantly different when classified by subject area specialization of the teacher, when analyses of variance were performed on the six factor scores it was found that scores on Use of Space and Time were significantly different (Table 37). The Scheffé multiple comparison test revealed that the mean score of teachers in the Mathematics-Science group was significantly lower than the means for teachers in the other two subject groups. This indicates that the Mathematics-Science teachers reported less frequent change in practices related to the Use of Space and Time than did teachers in the other two areas. Such a finding is consistent with that discussed earlier relating to who makes decisions regarding practices since, in both cases there appeared to be a tendency for Mathematics-Science teachers to report a more controlled, stable situation, although on fewer dimensions of this scale.

When data for junior high and senior high teachers were analyzed separately, only one significant difference was found. Scores for senior high school teachers on Use of Space and Time were shown to be significantly different in different subject area

Table 37

Analysis of Variance of Factor Scores on Change in Practice Over Time for Junior and Senior High School Teachers Classified by Subject Area Specialization (N=153)

Subject Area	N	Means					
		Student Attendance	Inst. Materials	Inst. Process	Student Control	Space & Time	A-V Equipment
English-Social, Foreign Languages	58	49.36	49.62	51.40	49.41	48.63	49.97
Mathematics-Science	57	50.70	49.22	49.11	48.74	43.92	46.42
Home Economics, Industrial Arts, Business Education, Vocational Education	38	50.75	48.24	49.21	47.54	49.13	49.57
MS_b		33.97	10.03	91.44	40.09	432.50	208.09
MS_w		95.13	96.97	113.97	99.64	72.99	100.88
F Ratios		0.36	0.10	0.80	0.40	5.93	2.06
p		.70	.90	.45	.67	.00	.13

specializations (Table 38). Although the Scheffé test did not indicate significant differences between pairs of group means at the .05 level, the mean score for the Mathematics-Science teachers was lower than that for the other two groups which was consistent with the finding reported for junior and senior high school teachers combined.

UNIFORMITY OF PRACTICE

Responses of teachers to Part III--Uniformity of Practice--were on a four-point scale. Respondents were asked to indicate the extent of application of a practice by marking one of the following responses:

4. Same for all students in the grade
3. Same for all students in a class
2. Same for all students in a subgroup of a class
1. Applies to individual students only.

Item scores ranged from 1 to 4 with the higher scores indicating greater uniformity in the application of practices to students. Total scores for Uniformity of Practice might range from 4 to 72 and again factor scores were used as measures of the underlying dimensions of this scale.

Type of School

The total scores of teachers on Uniformity of Practice were classified by type of school and subjected to an analysis of variance. As presented in

Table 38

Analysis of Variance of Factor Scores on Change in Practice Over Time for Senior High School Teachers Classified by Subject Area Specialization (N=87)

		Means					
Subject Area	N	Student Attendance	Inst. Materials	Inst. Process	Student Control	Space & Time	A-V Equipment
English-Social, Foreign Languages	27	50.50	50.07	51.96	49.81	50.40	50.23
Mathematics-Science	34	53.76	49.56	47.81	49.65	44.87	44.96
Home Economics, Industrial Arts, Business Education, Vocational Education	26	51.57	49.15	51.75	48.50	50.03	49.37
MS_b		85.03	5.91	169.94	13.66	297.03	248.56
MS_w		104.19	108.81	129.07	97.19	82.33	113.70
F Ratios		0.82	0.05	1.32	0.14	3.61	2.19
p		.45	.95	.27	.87	.03	.12

Table 39 this analysis showed that total scores were significantly different for different type schools. The Scheffé test indicated that the mean scores for teachers in these three types of schools were all significantly different from each other. The mean for teachers in junior high schools was highest indicating a tendency for greatest uniformity in the application of teaching-learning practices. This was followed by the mean for senior high school teachers with the mean for elementary teachers considerably lower than for the other two groups.

The factor scores which had been used as measures of six dimensions of Uniformity of Practice were also subjected to analyses of variance with type of school as the predictor. For each of the six factors the scores were significantly different when classified by type of school (Table 40). The Scheffé test revealed that the mean scores for elementary school teachers were significantly lower than those for junior and senior high school teachers on Uniformity of Practice regarding Pace of Student Learning, Type and Use of A-V Equipment, Evaluation, Type and Use of Instructional Materials, and the Instructional Process. The mean scores for elementary teachers and for senior high teachers were significantly lower than that for junior high teachers on Uniformity of Student Control Practices. On each of these six dimensions the direction of the mean scores was the same--lowest for elementary

Table 39

Analysis of Variance of Scores on Uniformity of Practice for Teachers in Three Types of Schools
(N=247)

Type of School	N	Means	MS_b	MS_w	F	p
Elementary	72	37.68	3364.87	63.64	52.88	.00
Junior High	82	50.48				
Senior High	93	47.29				

Table 40

Analysis of Variance of Factor Scores on Uniformity of Practice for Teachers in Three Types of Schools
(N=247)

		Means					
Type of School	N	Pace of Learning	Student Control	A-V Equipment	Student Evaluation	Inst. Materials	Inst. Process
Elementary	72	42.35	47.39	45.86	41.00	44.06	43.72
Junior High	82	53.62	54.07	51.59	54.86	52.80	53.75
Senior High	93	52.74	48.43	51.80	52.86	52.13	51.55
MS_b		2993.94	1040.25	870.44	4218.47	1801.94	2107.44
MS_w		76.70	92.70	94.09	66.66	86.46	83.96
F Ratios		39.04	11.22	9.25	63.28	20.84	25.10
p		.00	.00	.00	.00	.00	.00

teachers, followed by senior high teachers and highest for junior high teachers.

These findings indicate that, for the schools used in the study, there was a strong tendency for teachers in elementary schools to perceive that activities and practices of the teaching-learning process were more oriented to individual students than was so for junior and senior high school teachers. This phenomenon might reflect the fact that teaching is differently oriented to students of different age and maturity levels and with different needs. On the other hand, it might reflect more on the relative sizes of elementary schools as compared with junior and senior high schools, or on other factors such as the greater amount of subject teaching done in junior and senior high schools.

Schools Within Each Type

Separate analyses were performed on the scores of teachers in elementary schools, junior high schools, and senior high schools. Using the individual school as a predictor, no significant differences were found for the total scores or the factor scores of teachers in different elementary schools or in different junior high schools. In senior high schools it was found that differences existed in scores on the Uniformity in the Type and Use of A-V Equipment (Table 41); however, this difference was not strong ($p = .03$) and the Scheffé test which was applied showed no significant differences

Table 41

Analysis of Variance of Factor Scores on Uniformity of Practice for Teachers in Three Senior High Schools
(N=93)

School Number	N	Means					
		Pace of Learning	Student Control	A-V Equipment	Student Evaluation	Inst. Materials	Inst. Process
11	27	54.14	51.05	49.77	52.87	51.71	51.98
12	31	52.42	47.90	49.98	52.06	49.69	51.04
13	35	51.93	46.87	54.97	53.08	54.61	51.68
MS_b		39.75	139.97	282.63	9.25	202.09	6.87
MS_w		92.95	83.23	77.44	66.08	90.71	103.59
F Ratios		0.43	1.68	3.65	0.14	2.23	0.07
p		.65	.19	.03	.87	.11	.94

between the pairs of means for these three schools.

Subject Area Specialization

When junior and senior high school teachers were classified by subject area specialization, the analysis of variance which was performed on the total Uniformity of Practice scores showed no significant differences. A similar analysis which was done on the factor scores showed a significant difference between the scores on Uniformity in the Pace of Student Learning in different subject areas (Table 42). A Scheffé test was used and it showed that the mean score for teachers in the Mathematics-Science area was significantly higher than that for teachers in the Practical Subjects indicating greater uniformity of practice reported by Mathematics-Science teachers.

The scores for junior and senior high school teachers were again analyzed separately. Although no significant differences were found among total scores for junior high school teachers in different subject areas, there was a significant difference on Uniformity in the Type and Use of A-V Equipment (Table 43). However, the difference was weak and the Scheffé test did not indicate any significant differences in the pairs of means.

For senior high school teachers no significant differences were found among total Uniformity of Practice scores in different subject areas. Table 44

Table 42

Analysis of Variance of Factor Scores on Uniformity of Practice for Junior and Senior High School Teachers Classified by Subject Area Specialization (N=153)

		Means					
Subject Area	N	Pace Learning	Student Control	A-V Equipment	Student Evaluation	Inst. Materials	Inst. Process
English-Social, Foreign Languages	58	52.54	51.60	51.59	52.72	50.65	51.92
Mathematics-Science	57	56.34	48.45	51.53	54.78	52.76	54.47
Home Economics Industrial Arts, Business Education, Vocational Education	38	51.36	52.29	52.97	54.21	53.99	51.99
MS_b MS_w		342.78 68.98	215.84 95.32	28.50 77.82	64.25 51.35	139.47 87.84	113.62 84.30
F Ratios		4.97	2.26	0.37	1.25	1.59	1.35
p		..01	.11	.69	.29	.21	.26

Table 43

Analysis of Variance of Factor Scores on Uniformity of Practice for Junior High School Teachers Classified by Subject Area Specialization
(N=66)

		Means					
Subject Area	N	Pace of Learning	Student Control	A-V Equipment	Student Evaluation	Inst. Materials	Inst. Process
English-Social, Foreign Languages	31	53.51	54.13	53.51	54.54	52.97	52.85
Mathematics-Science	23	56.45	51.95	48.67	54.94	50.75	56.16
Home Economics, Industrial Arts, Business Education	12	51.57	54.33	55.98	55.31	54.63	54.04
MS_b		107.03	37.47	255.78	2.78	65.53	72.25
MS_w		51.71	103.64	67.36	45.73	81.61	61.15
F Ratios		2.07	0.36	3.80	0.06	0.80	1.18
p		.13	.70	.03	.94	.45	.31

presents data to show that there were significant differences among the scores on Uniformity in the Type and Use of Instructional Materials. The Scheffé test revealed that the mean score for Mathematics-Science teachers was significantly higher than that for teachers in the Language-Social Subjects.

Although there were few significant differences among the scores of teachers in different subject areas on Uniformity of Practice, those reported showed a tendency for Mathematics-Science teachers to perceive practices to be more uniform in their application which seems not inconsistent with the findings reported for Parts I and II.

SUMMARY

This chapter has presented and discussed findings concerning differences in dimensions of the teaching-learning process as perceived by teachers in different type schools, different schools of each type, and different subject area specializations of the teachers. Differences reported were determined by means of one-way analyses of variance of total scores and factor scores and, where appropriate, by the Scheffé method of multiple comparison of group means. The findings are presented in summary form in Table 45.

Table 44

Analysis of Variance of Factor Scores on Uniformity of Practice for Senior High School Teachers Classified by Subject Area Specialization
(N=87)

		Means					
Subject Area	N	Pace of Learning	Student Control	A-V Equipment	Student Evaluation	Inst. Materials	Inst. Process
English-Social, Foreign Languages	27	51.43	48.71	49.39	50.63	47.98	50.85
Mathematics-Science	34	56.27	46.08	53.47	54.67	54.12	53.32
Home Economics, Industrial Arts, Business Education, Vocational Education	26	51.25	51.35	51.57	53.70	53.69	51.05
MS_b		251.53	205.87	125.44	128.94	331.19	58.88
MS_w		83.66	80.97	79.90	54.52	89.48	101.82
F Ratios		3.01	2.54	1.57	2.36	3.70	0.58
p		.06	.09	.21	.10	.03	.56

Table 45

Summary of Findings for Dimensions of the Teaching-Learning Process in Different Type Schools, Different Schools of Each Type, and Different Subject Area Specializations

Classification	Scale		
	Locus of Decision	Change in Practice Over Time	Uniformity of Practice
Type of School	further from student in junior high than in elementary or senior high on: - Student Promotion - Instructional Materials further from student in senior high than in elementary on: - A-V Equipment	more frequent in elementary than in junior or senior high on: - total scale - Space & Time - A-V Equipment more frequent in senior high than in junior high on: - Student Attendance	more uniform in junior high than in senior high than in elementary on: - total scale more uniform in junior & senior high than in elementary on: - Pace of Learning - A-V Equipment - Student Evaluation - Instructional Materials - Instructional Process more uniform in junior high than in elementary or senior high on: - Student Control
Schools Within Each Type	further from student in elementary no.2 than no.6 on: - total scale - Control of Students	more frequent in senior high no.13 than no.12 on: - Student Attendance - Student Control	scores in three senior high schools different on: - A-V Equipment
Subject Area Specialization	Junior & Senior High further from student in Mathematics-Science than in Language-Social or Practical Subjects on: - total scale - Control of Students - Objectives & Sequencing further from student in Mathematics-Science than in Practical Subjects on: - Student Promotion - Instructional Materials further from student in Mathematics-Science than in Language-Social on: - Instructional Process Junior High further from student in Mathematics-Science than in Practical Subjects on: - total scale - Objectives & Sequencing Senior High further from student in Mathematics-Science than in Language-Social or Practical Subjects on: - total scale - Objectives & Sequencing further from student in Mathematics-Science than in Language-Social on: - Student Promotion - Instructional Materials - Student Control	Junior & Senior High more frequent in Mathematics-Science than in Language-Social or Practical Subjects on: - Space & Time Senior High scores in three subject areas different on: - Space & Time	Junior & Senior High more uniform in Mathematics-Science than in Practical Subjects on: - Pace of Learning Junior High scores in three subject areas different on: - A-V Equipment Senior High more uniform in Mathematics-Science than in Language-Social on: - Instructional Materials

Chapter 7

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

SUMMARY

The concern has been expressed that, both in the study of organizations generally and educational organizations in particular, greater attention be directed towards description-oriented inquiry aimed at understanding the nature of total organizations and of particular aspects of them. Such understanding, which is prerequisite to sound prescription, was the focus of this study. The major process of the school was considered to be the teaching-learning process as it occurs at the classroom level of operation and it was this which was isolated for examination.

To explicate the concerns of the study it was divided into three distinct but interrelated phases or problem areas. These were:

1. To conceptualize the teaching-learning process as it occurs at the classroom level of operation;
2. To develop an instrument to measure those dimensions of the teaching-learning process conceptualized as being important; and
3. To determine what differences, if any, existed

between teachers' perceptions of the teaching-learning process in different type schools, different schools of each type, and different subject area specializations.

Conceptual Framework

Schools were viewed as open systems which engage in exchanges with their environments and which function in terms of input-throughput-output processes. Within the boundary of the system a number of processes are taking place which consist of related activities associated with the same category of system needs. The major process of an educational system is identified as the teaching-learning process which is defined by the activities engaged in when a teacher teaches something to a student or group of students in a particular situation. These activities, which may take place at the preactive, interactive, or postactive phases of the process, consist of defining instructional objectives, selecting and using instructional resources, grouping students, sequencing the workflow, instructing, evaluating, and controlling students. It was suggested that four major determinants of the nature of these various activities as they occur in any given situation are the pedagogical perspective of those who make decisions related to the various process activities, the curriculum perspective of those involved, the career perspective of those involved, and various organizational realities concerning such matters as patterns of organization and the availability and allocation of resources. These determinants, as well as various conceptualizations of organizational technology, suggested that the teaching-learning process might be characterized in terms of the locus of decision regarding process activities, the degree to which these activities are programmed, and the extent to which the activities apply uniformly to students.

Design and Methodology

This study was considered to be a methodological, exploratory study--methodological in that it was concerned with developing a technique for descriptive inquiry based on the conceptual framework developed, and exploratory in that it sought to determine the nature of the teaching-learning process in various situations.

In the development of the questionnaire and in the examination of the underlying dimensions being measured, use was made of the factor analysis technique. In line with the explanatory view of factor analysis the common-factor model was adopted and the option used was the maximum-likelihood procedure which incorporates a statistical test for the number of factors. Two Harris-Kaiser oblique transformations were obtained and the one which gave the clearer solution was accepted. The reliability of the measures was examined in terms of item-subscale and item-total scale correlations and in addition the coefficient alpha was obtained for each scale and its subscales. Differences in perceptions of process variables when teachers were classified by type of school, schools within each type, and subject area specialization of the teacher were examined using a one-way analysis of variance and, where appropriate, the Scheffé method of multiple comparison.

Instrument Development and Analysis

The instrument was developed in three stages. Based on the conceptual framework proposed and drawing on various sources for items, a three-part questionnaire was prepared and circulated to 28 people for reaction and comment. A revised form of the questionnaire was prepared and responded to by 99 teachers in nine schools with grade combinations from I - XII. On the basis of factor analysis and item analysis this 90 item questionnaire was reduced to three scales of 18 items each, consisting of three, four, and four proposed subscales respectively. This final form of the questionnaire was administered to 340 teachers in a stratified random sample of six elementary schools, four junior high schools, and three senior high schools in a large urban school system. Completed questionnaires were received from 247 teachers. These data were also subjected to factor analysis and reliability estimates were obtained.

This resulted in six subscales being proposed for each of the three scales. These differed from those proposed earlier primarily in the tendency for the earlier subscales to divide in two. The internal consistency estimates for the three scales and all but one of the subscales were considered to be adequate. For this one subscale the coefficient alpha, though relatively high, did not reach the 0.50 to 0.60 minimum range which was suggested.

Findings Concerning Differences in Perceptions of the Teaching-Learning Process

Locus of Decision. Generally, it was found that differences in Locus of Decision were most evident in different subject area specializations. When teachers in junior and s~~enior~~ high schools were combined, Mathematics-Science teachers tended to perceive decisions to be further removed from students than did teachers in Language-Social Studies and/or Practical Subjects on Locus of Decision as a whole and on the dimensions concerned with Control of Student Promotion, Control of Instructional Materials, Control of Students, Control of Instruction and Evaluation, and Control of Objectives and Sequencing. For junior high school teachers only, there was a greater tendency for Mathematics-Science teachers to perceive decisions to be further removed from students than did teachers in the Practical Subjects on the whole scale, and on

Control of Objectives and Sequencing. In senior high schools Mathematics-Science teachers tended to perceive decisions to be further removed from students than did teachers in Language-Social Studies on Control of Student Promotion, Control of Instructional Materials, and Control of Students; they also perceived decisions to be further removed from students than did teachers in both other subject areas on Locus of Decision as a whole and on Control of Objectives and Sequencing.

It was also found that teachers in junior high schools perceived decisions to be further removed from students than did teachers in senior high schools on Control of Student Promotion and Control of Instructional Materials. Finally, a significant difference was found between the perceptions of teachers in two elementary schools on Locus of Decision as a whole and on Control of Students.

Change in Practice Over Time. The most notable difference in perceptions of Change in Practice Over Time was found in different type schools. Senior high school teachers tended to perceive greater frequency of change in practices than did junior high school teachers on Change in Regulation of Student Attendance. Elementary teachers perceived greater frequency of change than did teachers in either junior or senior high schools on the scale as a whole and on Change in the Use of Space and Time and Change in A-V Equipment and Its Use.

The perceptions of teachers in two senior high schools differed significantly on Change in Regulation of Student Attendance and Change in Control of Student Conduct. In junior and senior high schools Mathematics-Science teachers perceived more frequent change in practices than did teachers in either of the other two subject areas on Change in Use of Space and Time.

Uniformity of Practice. Differences in perceptions of practices which are the concern of this scale were also most evident in different type schools. For the scale as a whole perceptions of teachers in each type of school were all significantly different, with teachers in elementary schools reporting practices to be less uniform than did teachers in senior high schools, while teachers in junior high schools reported greatest uniformity of practice. Elementary teachers perceived practices to be less uniform than did teachers in junior and senior high schools on those dimensions concerned with Pace of Student Learning, Type and Use of A-V Equipment, Evaluation, Type and Use of Instructional Materials, and the Instructional Process. Both elementary and senior high school teachers reported practices to be less uniform than did junior high school teachers on the dimension concerned with Student Control.

In senior high schools there were differences in perceptions of Uniformity of Practice as a whole among different schools in which the teachers taught but it was not determined in which schools the differences occurred. Mathematics-Science teachers in junior and senior high schools perceived practices to be more uniform than teachers in Practical Subjects on Uniformity in the Pace of Student Learning. In senior high schools, Mathematics-Science teachers perceived practices to be more uniform than did teachers in Language-Social Studies on Uniformity in the Type and Use of Instructional Materials.

CONCLUSIONS

Conclusions Related to the Conceptual Framework

The seven categories of activities of the teaching-learning process were useful in focusing attention on the important process activities but in many instances they appear to have been too general. None of the categories appeared consistently in all three scales in the form proposed initially, although activities concerned with the instructional process and those concerned with student control tended to remain fairly consistent. The proposed category dealing with grouping of students did not reappear after the initial inclusion which might be related to the fact that the whole of the Uniformity of Practice scale is devoted to grouping of students. The tendency for a somewhat general category of activities to subdivide into more precise dimensions was most evident in the case of activities concerned with selection and use of instructional resources. Type and use of instructional materials and type and use of A-V equipment appeared as distinct dimensions of this general category on each of the three scales, and on Change in Practices Over Time the use of space and time appeared as another separate dimension. On Locus of Decision, evaluation grouped with activities of the instructional process whereas, on Uniformity of Practice, evaluation appeared as a separate dimension. The student promotion dimension which appeared only on the Locus of Decision scale did not group with workflow sequencing as had been proposed but remained as a separate dimension also. Based on these differences which have been noted, it might be concluded that the dimensions of activities of the teaching-learning process are more precise than was conceptualized and that various dimensions appear with greater clarity and strength in some characterizations of the teaching-learning process than in others.

The empirical evidence gathered appeared to support a type of consistency in the manner of response to the three ways by which the process activities were characterized. There was a strong tendency for teachers in junior high schools and for junior and senior high school teachers in the Mathematics-Science area to report decisions being made further from the student, with less frequent change in practice, and greater uniformity in the application of practices than was so for teachers in other types of schools or other subject area groupings. Such evidence appears to support a sort of cross-validation for the three modes of characterizing the process.

Conclusions Related to the Instrument Developed

The evidence gathered during the study indicated that the instrument which was developed appeared to perform adequately the function for which it was intended; that is, to measure various aspects of the teaching-learning process. Six of the seven categories of activities of the teaching-learning process were represented by items in the final draft of the questionnaire. Although, as was noted in the previous section, the dimensions of the process which emerged differed from those proposed in the conceptualization, they were generally not inconsistent with those proposed and, thus, might be considered to measure these dimensions. On the basis of the factor analyses performed on the data from the final administration of the questionnaire, the specific dimensions of the teaching-learning process were defined with reasonable clarity which adds further support to the construct validity of the measures. The reliability estimates for all three scales and for all but one subscale were considered to be quite adequate for description-oriented inquiry. Also, the form of the final draft of the questionnaire did not appear to present difficulties to respondents.

Despite the positive observations made with respect to the instrument which was developed, some question remains concerning its discriminating ability in certain situations. Although it appeared to be able to discriminate among respondents when classified by type of school and by subject area specialization, among the schools of a particular type the practices varied very little or the instrument did not detect differences which did indeed exist. Also the instrument was tested in only a limited variety of settings for its power of discrimination. If it does fail to discriminate well in certain situations, this might very well be attributable to its being designed to apply across a wide variety of situations and its forcing respondents to generalize regarding the teaching-learning process as they have experienced it.

Propositions Suggested from the Exploratory Findings

Rather than formulate conclusions from the limited exploratory use of the instrument in various settings, the major findings of this study suggest a number of propositions which might serve to provoke further study.

1. The more structured a subject area, the greater is the tendency for decisions concerning the teaching-learning process to be removed from the student.
2. The more structured a subject area, the greater is the tendency for practices of the teaching-learning process to be uniformly applied to students.
3. The more content oriented a subject area, the greater is the tendency for decisions concerning the teaching-learning process to be removed from the student.
4. The more content oriented a subject area, the greater is the tendency for practices of the teaching-learning process to be uniformly applied to students.
5. In elementary schools there is a greater tendency for practices of the teaching-learning process to change over time than in junior and senior high schools.
6. In junior and senior high schools there is a greater tendency for practices of the teaching-learning process to be uniformly applied to students than in elementary schools.

IMPLICATIONS

Implications for Theory Development

As was noted in the presentation of conclusions related to the conceptual framework, the conceptualization proposed appeared to be adequate except that the categories of activities of the teaching-learning process were too general. The sets of activities which comprise the process appear to be more distinct and precise than had been suggested and should be reformulated taking account of the results of the empirical examination of this study.

This study was based on the premise that schools can be viewed as distinct, formal organizations and that most general theoretical formulations which apply to other organizations can be applied to schools. The fact that the instrument which was developed and used in this study generally did not discriminate among individual schools suggests one of two conclusions: either the discriminating power of the instrument was weak, or schools as individual units of a given type do not differ greatly from each other on the variables examined but differ more as groups of units. To the extent that the latter conclusion is the more accurate, it suggests the inappropriateness of attempting to test general organizational propositions in units which differ very little on the variable of interest. The findings of this study need not refute the appropriateness of viewing school units as organizations, but could indicate that the testing of organizational propositions can more properly be done in units which differ more with respect to the variables of concern.

While literature in the field of organization theory has considered the influence of various factors on the primary production process or the organization's technology, more attention has been given to the proposition that technology has a determining effect on other organizational variables. After examining much of this literature, Hunt (1970:243) concludes that

> although the nature, degree, and conditions of its effect remain controversial, technology has been shown to affect structure, to shape interaction, and to influence the personal characteristics of the organizational members.

One of the sources of the disagreement referred to by Hunt appears to be the difficulty of being able to operationalize the technology concept; therefore, the concern of this study in conceptualizing what might be the school's equivalent to organizational technology and in developing an instrument to measure it, should facilitate the examination of relationships which might exist between the technology variable in schools and other organizational variables. Furthermore, such empirical study could provide further evidence to support or reject the premise that school units be treated as formal organizations in the usual sense.

Implications for Practice

The approach taken in the development of the Descriptors of the Teaching-Learning Process was a logical-empirical approach in that the initial three characterizations (scales) were logically derived while the subscales within each were empirically derived by means of factor analytic procedures. Such an approach appears to be quite appropriate in instrument development of this nature and the procedures used can readily be replicated in the development of similar instruments. An alternative might be to use an entirely empirical approach in which no categorization is proposed *a priori* but rather a hierarchical factor analysis approach is taken. By this approach factor analytic procedures would be applied at successive levels, each level of categories being more specific than the previous one so that the scales and subscales would be derived entirely on an empirical basis.

In the final phase of this study, the various dimensions of the teaching-learning process were measured and reported as factor scores. However, the evidence from the study appears to be sufficient to support the use of the subscales which are proposed as adequate measures of these dimensions. This would facilitate the measurement of these dimensions by practitioners and by researchers, since the addition of item scores on each subscale can provide a measure of the dimensions without the necessity of further factor analysis and the subsequent computation of factor scores.

It was suggested earlier in the statement of the significance of this study that one potential use of an instrument to measure dimensions of the teaching-learning process would be in self-evaluation by teachers. Such use of this instrument appears to be quite reasonable. The major areas of the teaching-learning process appear to be represented in the instrument so that individual teachers or groups of teachers might examine and analyze practices as they are in their classrooms by reference to their own norms or to those suggested or expected by others. The exploratory finding reported in this study should suggest to teachers and to others who are concerned, that differences in the teaching-learning process as it occurs in different situations might not be accounted for merely on the basis of personal preferences or differing orientations of individual teachers but are influenced by many other factors; therefore, it would seem to be reasonable to expect that practices will not be alike in all teaching-learning situations.

Those concerned with the practice of educational administration might also find the Descriptors of the Teaching-Learning Process to be a useful instrument for analyzing the primary process of the school. Once again, the exploratory findings which indicate that the process is different in different situations would seem to imply that administrators be concerned to determine more precisely the nature of these differences, and be prepared to develop or permit the development of organizational structures and practices which best facilitate activities of the teaching-learning process in different situations. An expectation for process uniformity even within a single school appears to be unreasonable and even undesirable.

Suggestions for Further Research

As with any newly developed research instrument or technique, continued use of the *Descriptors of the Teaching-Learning Process* might do well to give further attention to refinement and further testing of its application to various situations. Although the reliability estimates concerning the internal consistency of the measures appeared to be quite adequate, estimates of its stability over time would also be useful.

In this study an attempt was made to determine the applicability of the instrument to teaching-learning practices generally across a variety of grade levels and subject areas. It would be useful to test the application of the instrument to a variety of more specific situations such as to a single grade level and/or subject area. Such an application should reveal whether or not the instrument can discriminate better in such situations than in the more general application.

The experience of using the Descriptors of the Teaching-Learning Process to examine the relationships between process variables and other school variables seems to justify the suggestion that it continue to be used in description-oriented inquiry. The further testing of the propositions suggested earlier, as well as the examination of relationships which might exist between dimensions of the teaching-learning process and other variables in school organizations could add considerably to our understanding of such organizations which would appear to be prerequisite to the formulation of sound prescription for their improvement.

REFERENCES

REFERENCES

Aoki, T.
1971 "Controlled change: a crucial curriculum component in social education." Paper presented at the Annual Conference of the National Council for the Social Studies, November 26, Denver, Colorado.

Amidon, Edmund, and Ned Flanders
1963 The Role of the Teacher in the Classroom. Minneapolis: Paul S. Amidon and Association.

Bakke, E. Wright
1959 "Concept of the social organization." In M. Haire (ed.), Modern Organization Theory: 16-75. New York: Wiley.

Bellack, Arnold, et al.
1966 The Language of the Classroom. New York: Teachers College Press, Columbia University.

Cattell, Raymond B.
1965 "Factor analysis: an introduction." Biometrics, 21:190-215.

Cattell, Raymond B.
1966 "The scree test for the number of factors." Multivariate Behavioral Research, 1:245-276.

Cattell, Raymond B.
1967 "Some suggestions for reformulating the validity concept." In David W. Payne and Robert F. McMorris (eds.), Educational and Psychological Measurement: 114-121. Waltham, Mass.: Blaisdell.

Esland, G. M.
1971 "Teaching and learning as the organization of knowledge." In M. F. D. Young (ed.), Knowledge and Control: New Directions for the Sociology of Education: 70-115. London: Collier-Macmillan.

Ferguson, George A.
1971 Statistical Analysis in Psychology and Education. New York: McGraw-Hill.

Gibbons, Maurice
1970 "What is individualization?" Interchange, 1(2):28-52.

Green, Thomas F.
1965 "A typology of the teaching concept." Studies in Philosophy and Education. 13(4):284-319.

Guilford, J.P.
1965 Fundamental Statistics in Psychology and Education. New York: McGraw-Hill.

Hakstian, A. R., and Kyung S. Bay
1972 User's Manual to Accompany the Alberta General Factor Analysis Program. Edmonton: Division of Educational Research Services, University of Alberta.

Hakstian, A. R., and V. J. Muller
1973 "Some notes on the number of factors problem." Multivariate Behavioral Research, 8 (in press).

Harman, Harry H.
1967 Modern Factor Analysis. Chicago: University of Chicago Press.

Harman, Harry H.
1968 "Factor analysis." In D. K. Whitla (ed.), Handbook of Measurement and Assessment in Behavioral Sciences: 143-170. Reading, Mass.: Addison-Wesley.

Harris, C. W., and H. F. Kaiser
1964 "Oblique factor analytic solutions by orthogonal transformations." Psychometrika, 29:347-362.

Hickson, David J., D. S. Pugh, and Diana C. Pheysey
1969 "Operations technology and organization structure: a reappraisal." Administrative Science Quarterly, 14:378-397.

Hunt, Raymond G.
1970 "Technology and organization." Academy of Management Journal, 13:235-252.

Jackson, Philip
1966 "The way teaching is." In A.S.C.D. The Way Teaching Is: 7-27. Washington, D.C.: the Association for Supervision and Curriculum Development.

Johnson, Mauritz
1967 "Definitions and models in curriculum theory." Educational Theory, 17:127-140.

Johnson, Mauritz
1969 "The translation of curriculum into instruction." Journal of Curriculum Studies, 1(2):115-131.

Katz, Daniel, and Robert L. Kahn
1966 The Social Psychology of Organizations. New York: Wiley.

Kerlinger, Fred N.
1967 Foundations of Behavioral Research. New York: Holt, Rinehart and Winston.

Lazarsfeld, Paul, and Sam Sieber
1964 Organizing Educational Research. Englewood Cliffs, N.J.: Prentice-Hall.

Maccia, Elizabeth Steiner
1972 "Conceptual structures for curriculum inquiry." Paper presented at the American Educational Research Association Meeting, April 7, Chicago, Illinois.

Macdonald, James B.
1965 "Educational models for instruction - introduction." In James B. Macdonald and Robert R. Leeper (eds.), Theories of Instruction: 1-7. Washington, D.C.: Association for Supervision and Curriculum Development.

Miklos, Erwin
1970 "The organization and administration of educational systems: internal structures and processes." A position paper to the Commission on Educational Planning, Edmonton, Alberta.

Nunnally, Jum C.
1967 Psychometric Theory. New York: McGraw-Hill.

Kaplan, Abraham
1964 The Conduct of Inquiry. Scranton, Penn.: Chandler.

Parsons, Talcott
1960 Structure and Process in Modern Societies. New York: Free Press.

Perrow, Charles
1967 "A framework for the comparative analysis of organizations." American Sociological Review, 32:194-208.

Perrow, Charles
1968 "The effect of technological change on the structure of business firms." In B. C. Roberts (ed.), Industrial Relations: Contemporary Issues: 205-219. New York: Macmillan.

Perrow, Charles
1970 Organizational Analysis: A Sociological View. Belmont, Cal.: Brooks/Cole Publishing.

Pugh, D. S., et al.
1963 "A conceptual scheme for organizational analysis." Administrative Science Quarterly, 8:289-315.

Rummel, R. J.
1970 Applied Factor Analysis. Evanston: Northwestern University Press.

Scott, William G., and Terence R. Mitchell
1973 Organization Theory: A Structural and Behavioral Analysis. Homewood, Ill.: Dorsey Press.

Smith, B. Othanel
1963 "A Conceptual analysis of instructional behavior." Journal of Teacher Education, 14:294-298.

Smith, B. Othanel, and Robert Ennis
1961 Language and Concepts in Education. Chicago: Rand McNally.

Thompson, James D.
1967 Organizations in Action. New York: McGraw-Hill.

Thompson, James D., and Frederick L. Bates
1957 "Technology, organization and administration." Administrative Science Quarterly, 2:325-343.

Thorndike, R. L., and Elizabeth Hagen
1969 Measurement and Evaluation in Psychology and Education. New York: Wiley.

Thurston, L. L.
1947 Multiple-Factor Analysis. Chicago: University of Chicago Press.

Traub, Ross E., et al.
1972 "Closure on openness: describing and quantifying open education." Interchange, 3(2-3): 69-84.

Udy, S. H.
1965 "The comparative analysis of organizations." In James G. March (ed.), Handbook of Organizations: 678-709. Chicago: Rand McNally.

Whyte, William F.
1969 Organization Behavior: Theory and Application. Homewood, Ill.: Dorsey Press.

Woodward, Joan
1965 Industrial Organizations: Theory and Practice. London: Oxford University Press.

Worth, Walter H.
1972 A Choice of Futures. Report of the Commission on Educational Planning. Edmonton: Queen's Printer for the Province of Alberta.

APPENDIX A

COPY OF THE QUESTIONNAIRE USED IN THE PILOT STUDY

DESCRIPTORS OF THE TEACHING-LEARNING PROCESS

This questionnaire is designed to obtain a description of aspects of the teaching-learning process on a number of dimensions. It is not intended to imply that one mode of operation is better than another, nor are you being asked to indicate what you think should be done. Rather, you are asked to respond to each item in accordance with your perception of the situation as it is in your classroom.

Before responding to the questionnaire please note the following carefully:

1. Please respond to the items in this questionnaire in terms of the class(es) which you are presently teaching.

2. It is recognized that a response may not apply equally well to all subjects, classes, or activities, or at all times. Therefore, you are asked to select the response which best typifies the situation with respect to the class(es) you teach.

3. Please respond to every item in each part of the questionnaire in accordance with the directions given at the beginning of each part.

4. Do not write your name on the questionnaire since all responses are to be treated anonymously.

PART 1 WHO MAKES DECISIONS

DIRECTIONS

1. For each of the following items consider which of the responses A, B, C, D, or E below best describes who generally decides on the matter referred to by the item.
2. Circle one of the five letters following the item to show which response you have selected.

A = OUTSIDE SOURCE - A source outside the class setting makes the decision (e.g. central office, school administrators, other teachers).

B = OUTSIDE SOURCE AND TEACHER - An outside source and the teacher make the decision.

C = TEACHER - The teacher alone makes the decision.

D = TEACHER AND STUDENT - The teacher and the student(s) make the decision with or without the help of an outside source.

E = STUDENT - The student alone makes the decision. Such a decision might be made after consultation with parents or friends but is essentially the student's decision.

WHO DECIDES

1. The assignment of students to your class(es). A B C D E
2. Whether or not you divide your class(es) into subgroups for instructional purposes. A B C D E
3. The textbooks which are used. A B C D E
4. The way in which textbooks are used. A B C D E
5. What instructional materials other than textbooks are used. A B C D E
6. The ways in which these other instructional materials are used. A B C D E
7. The types of A-V equipment which are used. A B C D E
8. When various items of A-V equipment are used. A B C D E

A = OUTSIDE SOURCE
B = OUTSIDE SOURCE AND TEACHER
C = TEACHER
D = TEACHER AND STUDENT
E = STUDENT

WHO DECIDES

9. By whom various items of A-V equipment are used in your class(es). A B C D E

10. What other adults are involved in class activities. A B C D E

11. The ways in which other adults are involved in class activities. A B C D E

12. The location where various learning activities are carried on whether in a single classroom, a variety of different areas in the school, or various places outside the school. A B C D E

13. The extent to which students are permitted to move around in their learning environment. A B C D E

14. The amount of time which is allocated to the specific subject(s) which you teach. A B C D E

15. The amount of unstructured time during which students are permitted to pursue their own interests. A B C D E

16. The time period which is scheduled for the specific subject(s) which you teach. A B C D E

17. The pace at which content is to be covered by students. A B C D E

18. When students are to move from one learning activity or unit to the next. A B C D E

19. When particular units or topics are dealt with. A B C D E

20. When students are to be promoted. A B C D E

21. The basis on which students are to be promoted. A B C D E

22. What is to be achieved by the activities of students in the class setting. A B C D E

23. The nature of your role as a teacher in particular teaching-learning situations. A B C D E

A = OUTSIDE SOURCE
B = OUTSIDE SOURCE AND TEACHER
C = TEACHER
D = TEACHER AND STUDENT
E = STUDENT

WHO DECIDES

24. The specific teaching methods you use. A B C D E

25. The methods of learning and problem solving used by the student. A B C D E

26. Whether or not homework is assigned. A B C D E

27. The methods of evaluation which are used. A B C D E

28. The use which is made of the results of evaluation. A B C D E

29. How often evaluation takes place. A B C D E

30. The attendance of students at school. A B C D E

31. The attendance of students in class for particular subjects or activities. A B C D E

32. What action is taken when a student has been absent from class. A B C D E

33. What action is taken when a student comes to class late. A B C D E

34. Rules for student conduct while engaged in class related activities. A B C D E

35. What action is taken in the event of a serious breach of the rules of conduct. A B C D E

PART II CHANGE IN PRACTICE OVER TIME

DIRECTIONS

1. For each of the following items consider which of the responses A, B, C, D, or E below best describes how often there is change in the matter referred to by the item.

2. Circle one of the five letters following the item to show which response you have selected.

A = AT LEAST ONCE A DAY

B = AT LEAST ONCE A WEEK

C = AT LEAST ONCE A MONTH

D = AT LEAST ONCE A YEAR

E = NOT AT ALL DURING THE YEAR

HOW OFTEN IS THERE CHANGE IN

36. The group composition of students whether it be one large group, or two or more instructional subgroups. A B C D E

37. The decision about which textbooks are used. A B C D E

38. The way in which textbooks are used. A B C D E

39. The instructional materials other than textbooks which are used. A B C D E

40. The ways in which these other instructional materials are used. A B C D E

41. The types of A-V equipment which are used. A B C D E

42. Who uses various items of A-V equipment in your class(es). A B C D E

43. What other adults are involved in class activities. A B C D E

44. The ways in which other adults are involved in class activities. A B C D E

A = AT LEAST ONCE A DAY
B = AT LEAST ONCE A WEEK
C = AT LEAST ONCE A MONTH
D = AT LEAST ONCE A YEAR
E = NOT AT ALL DURING THE YEAR

HOW OFTEN IS THERE CHANGE IN

45. The location where various learning activities are carried on whether in a single classroom, a variety of different areas in the school, or various places outside the school. A B C D E

46. The extent to which students are permitted to move around in their learning environment. A B C D E

47. The amount of time which is allocated to the specific subject(s) which you teach. A B C D E

48. The amount of unstructured time during which students are permitted to pursue their own interests. A B C D E

49. The time period which is scheduled for the specific subject(s) which you teach. A B C D E

50. The instructional objectives to be achieved by student activities. A B C D E

51. The nature of your role as a teacher in particular teaching-learning situations. A B C D E

52. The specific teaching methods you use. A B C D E

53. The methods of learning and problem solving used by the student. A B C D E

54. The kinds of activities which accompany or follow the study of particular content. A B C D E

55. The methods of evaluation which are used. A B C D E

56. The action you take when a student has been absent from class. A B C D E

57. The action you take when a student comes to class late. A B C D E

58. Rules for student conduct while engaged in class related activities. A B C D E

59. The action which you take in the event of a serious breach of the rules of conduct. A B C D E

PART III UNIFORMITY OF PRACTICE

DIRECTIONS

1. For each of the following items consider which of the responses A, B, C, or D below best describes whether the matter referred to by the item is genreally the same for all students, for some students, or applies to individual students only.

2. Circle one of the four letters following the item to show which response you have selected.

A = SAME FOR ALL STUDENTS IN THE GRADE - All students at this grade level in the school.

B = SAME FOR ALL STUDENTS IN A CLASS - All students in the same class but not all students at this grade level in the school.

C = SAME FOR ALL STUDENTS IN A SUBGROUP OF A CLASS - All students in a subgroup of a class but not the whole class.

D = APPLIES TO INDIVIDUAL STUDENTS ONLY.

HOW UNIFORM ARE PRACTICES REGARDING

60. The textbooks which are used. A B C D

61. The way in which textbooks are used. A B C D

62. The instructional materials other than textbooks which are used. A B C D

63. The ways in which these other instructional materials are used. A B C D

64. The types of A-V materials which are used. A B C D

65. When various items of A-V equipment are used. A B C D

66. The location where various learning activities are carried on whether in a single classroom, a variety of different areas in the school, or various places outside the school. A B C D

67. The extent to which students are permitted to move around in their learning environment. A B C D

A = SAME FOR ALL STUDENTS IN THE GRADE
B = SAME FOR ALL STUDENTS IN A CLASS
C = SAME FOR ALL STUDENTS IN A SUBGROUP OF A CLASS
D = APPLIES TO INDIVIDUAL STUDENTS ONLY

HOW UNIFORM ARE PRACTICES REGARDING

68. The amount of time which is allocated to the specific subject(s) which you teach. A B C D

69. The amount of unstructured time during which students are permitted to pursue their own interests. A B C D

70. The time period which is scheduled for the specific subject(s) which you teach. A B C D

71. The pace at which content is to be covered by students. A B C D

72. When students are to move from one learning activity or unit to the next. A B C D

73. When particular units or topics are dealt with. A B C D

74. When students are to be promoted. A B C D

75. The basis on which students are to be promoted. A B C D

76. What is to be achieved by the activities of students in the class setting. A B C D

77. The nature of your role as a teacher in particular teaching-learning situations. A B C D

78. The specific teaching methods you use. A B C D

79. The methods of learning and problem solving used by the student. A B C D

80. The kinds of activities which accompany or follow the study of particular content. A B C D

81. Whether or not homework is assigned. A B C D

82. The methods of evaluation which are used. A B C D

83. The use which is made of the results of evaluation. A B C D

84. How often evaluation takes place. A B C D

85. The requirement for the attendance of students at school . A B C D

A = SAME FOR ALL STUDENTS IN THE GRADE
B = SAME FOR ALL STUDENTS IN A CLASS
C = SAME FOR ALL STUDENTS IN A SUBGROUP OF A CLASS
D = APPLIES TO INDIVIDUAL STUDENTS ONLY

HOW UNIFORM ARE PRACTICES REGARDING

86. The reqirement for the attendance of students in class for particular subjects or activities. A B C D

87. The action which is taken when a student has been absent. A B C D

88. The action which is taken when a student is late for class. A B C D

89. Rules for student conduct while engaged in class related activities. A B C D

90. The action which is taken in the event of a serious breach of the rules of conduct. A B C D

PART IV YOUR TEACHING ASSIGNMENT

91. In which grade(s) do you teach? (Check one or more)

___ One
___ Two
___ Three
___ Four
___ Five
___ Six

___ Seven
___ Eight
___ Nine
___ Ten
___ Eleven
___ Twelve

92. Indicate approximately the percentage of your teaching time spent in one or more of the following subject areas. (These should total 100%)

____ Reading
____ Social Studies
____ English
____ French
____ Language (Other than English or French)
____ Mathematics

____ Science
____ Fine Arts
____ Physical Education
____ Home Economics
____ Industrial Arts
____ Business Education
____ Other (specify)

93. What is the total number of different students that you instruct in a week? (Check one)

___ Under 30 students
___ 30 - 39 "
___ 40 - 49 "
___ 50 - 99 "
___ 100 - 149 "
___ 150 - 199 "
___ 200 - 299 "
___ 300 - 399 "
___ 400 or more students

THANK YOU VERY MUCH FOR YOUR ASSISTANCE

APPENDIX B

COPY OF THE FINAL QUESTIONNAIRE

DESCRIPTORS OF THE TEACHING-LEARNING PROCESS

This questionnaire is designed to obtain a description of aspects of the teaching-learning process on a number of dimensions. It is not intended to imply that one mode of operation is better than another, nor are you being asked to indicate what you think should be done. Rather, you are asked to respond to each item in accordance with your perception of the situation as it is in your classroom.

Before responding to the questionnaire please note the following carefully:

1. Please respond to the items in this questionnaire in terms of the class(es) which you are presently teaching.
2. It is recognized that a response may not apply equally well to all sujects, classes, or activities, or at all times. Therefore, you are asked to select THE RESPONSE WHICH BEST TYPIFIES THE SITUATION WITH RESPECT TO THE CLASS(ES) YOU TEACH even though there might be exceptions.
3. Please respond to EVERY item in each part of the questionnaire in accordance with the directions given at the beginning of each part.
4. Do not write your name on the questionnaire since all responses are to be treated anonymously.

PART I

LOCUS OF DECISION

DIRECTIONS:

a. For each of the following items consider which of the responses A, B, C, D, or E below best describes who generally decides on the matter referred to by the item.

b. Circle one of the five letters following the item to show which response you have selected.

A = OUTSIDE SOURCE - A source outside the class setting makes the decision (e.g., central office, school administrators, other teachers).

B = OUTSIDE SOURCE AND TEACHER - An outside source and the teacher make the decision.

C = TEACHER - The teacher alone makes the decision.

D = TEACHER AND STUDENT - The teacher and the student(s) make the decision with or without the help of an outside source.

E = STUDENT - The student alone makes the decision. Such a decision might be made after consultation with parents or friends but is essentially the student's decision.

WHO DECIDES

1. The way in which textbooks are used . . . . A B C D E
2. What instructional materials other than textbooks are used . . . . A B C D E
3. The way in which these other instructional materials are used . . . A B C D E
4. The types of A-V equipment which are used . . . . A B C D E
5. When various items of A-V equipment are used . . . . A B C D E
6. When particular units or topics are dealt with. . . . . A B C D E
7. The pace at which content is to be covered by students. . . . . . . A B C D E
8. What is to be achieved by the activities of students in the class setting . . . . A B C D E
9. The nature of your role as a teacher in particular teaching-learning situations . . . . A B C D E
10. The specific teaching methods you use . . . . A B C D E
11. Whether or not homework is assigned . . . . A B C D E
12. The methods of evaluation which are used. . . . . A B C D E
13. The use which is made of the results of evaluation. . . . . A B C D E
14. The basis on which students are to be promoted. . . . . A B C D E
15. When students are to be promoted. . . . . A B C D E
16. What action is taken when a student has been absent from class . . . . A B C D E
17. What action is taken when a student comes to class late . . . . . . A B C D E
18. What action is taken in the event of a serious breach of the rules of conduct. . . . . A B C D E

PART II

CHANGE IN PRACTICE OVER TIME

DIRECTIONS:

a. For each of the following items consider which of the responses A, B, C, D, or E below best describes how often there is change in the matter referred to by the item.

b. Circle one of the five letters following the item to show which response you have selected.

A = VERY FREQUENTLY - An average of at least once a day

B = OFTEN - An average of at least once a week

C = OCCASIONALLY - An average of at least once a month

D = SELDOM - An average of at least once a year

E = NOT AT ALL DURING THE YEAR

HOW OFTEN IS THERE CHANGE IN

1. The way in which textbooks are used . . . . A B C D E
2. The instructional materials other than textbooks which are used. . . . . A B C D E
3. The way in which these other instructional materials are used. . . . . A B C D E
4. The types of A-V equipment which are used . . . . A B C D E
5. Who uses various items of A-V equipment in your class(es) . . . . . A B C D E
6. The instructional objectives to be achieved by student activities. . . . . A B C D E
7. The nature of your role as a teacher in particular teaching-learning situations . . . . A B C D E
8. The specific teaching methods you use . . . . A B C D E
9. The methods of learning and problem solving used by the student . . . . A B C D E
10. The kinds of activities which accompany or follow the study of particular content . . . . A B C D E
11. The location where various learning activities are carried on, whether in a single classroom, a variety of different areas in the school, or various places outside the school. . . . . A B C D E
12. The extent to which students are permitted to move around in their learning environment. A B C D E
13. The amount of time which is allocated to the specific subject(s) which you teach . . . . A B C D E
14. The amount of unstructured time during which students are permitted to pursue their own interests . . . . A B C D E
15. The action you take when a student has been absent from class . . . A B C D E
16. The action you take when a student comes to class late. . . . . A B C D E
17. Rules for student conduct while engaged in class related activities. . . . . A B C D E
18. The action which you take in the event of a serious breach of the rules of conduct . . . . A B C D E

PART III UNIFORMITY OF PRACTICE

DIRECTIONS:

a. For each of the following items consider which of the responses A, B, C, or D below best describes whether the matter referred to by the item is generally the same for all students, for some students, or applies to individual students only.

b. Circle one of the four letters following the item to show which response you have selected.

A = SAME FOR ALL STUDENTS IN THE GRADE - All students at this grade level in the school.

B = SAME FOR ALL STUDENTS IN A CLASS - All students in the same class but not all students at this grade level in the school.

C = SAME FOR ALL STUDENTS IN A SUBGROUP OF A CLASS - All students in a subgroup of a class but not the whole class.

D = APPLIES TO INDIVIDUAL STUDENTS ONLY

HOW UNIFORM ARE PRACTICES REGARDING

1. The textbooks which are used . . . . A B C D
2. The way in which textbooks are used. . . . . A B C D
3. The instructional materials other than textbooks which are used . . . . A B C D
4. The way in which these other instructional materials are used . . . . A B C D
5. The types of A-V equipment which are used. . . . . A B C D
6. When various items of A-V equipment are used . . . . A B C D
7. The pace at which content is to be covered by students . . . . . . A B C D
8. When students are to move from one learning activity or unit to the next. . . . . A B C D
9. The specific teaching methods you use. . . . . A B C D
10. The methods of learning and problem solving used by the student. . . . . A B C D
11. The kinds of activities which accompany or follow the study of particular content. A B C D
12. Whether or not homework is assigned. . . . . A B C D
13. The methods of evaluation which are used . . . . A B C D
14. The use which is made of the results of evaluation . . . . A B C D
15. How often evaluation takes place . . . . A B C D
16. The action which is taken when a student has been absent . . . . . A B C D
17. The action which is taken when a student is late for class . . . . A B C D
18. The acti[illegible]hich is taken in the event of a serious breach of the [illegible]s of conduct. . . . . A B C D

PART IV YOUR TEACHING ASSIGNMENT

IF YOU TEACH IN AN ELEMENTARY SCHOOL

1. In which grade(s) do you teach? (check one or more)

______ (1) Kindergarten
______ (2) Grade One
______ (3) Grade Two
______ (4) Grade Three
______ (5) Grade Four
______ (6) Grade Five
______ (7) Grade Six

2. If you specialize in the teaching of a particular subject:

(1) What is that subject? ______________________________
(2) What percentage of your teaching time is devoted to it?_____

IF YOU TEACH IN A JUNIOR HIGH SCHOOL OR A SENIOR HIGH SCHOOL

1. In which grade(s) do you teach? (check one or more)

______ (1) Grade Seven
______ (2) Grade Eight
______ (3) Grade Nine
______ (4) Grade Ten
______ (5) Grade Eleven
______ (6) Grade Twelve

2. Check the one subject area below in which you spend more than 50% of your teaching time.

______ (1) English-Social Studies
______ (2) French-Foreign Language
______ (3) Mathematics-Science
______ (4) Creative Arts (e.g., music, drama, art)
______ (5) Physical Education
______ (6) Home Economics
______ (7) Industrial Arts
______ (8) Business Education
______ (9) Vocational Education (other than Business Education)
______ (10) Other (specify) ______________________________

THANK YOU VERY MUCH FOR YOUR ASSISTANCE

APPENDIX C

OBLIQUE PRIMARY-FACTOR STRUCTURE MATRICES FOR EACH OF PARTS I, II, AND III IN THE USE OF THE FINAL FORM OF THE QUESTIONNAIRE

Table 46

Oblique Primary-Factor Structure Matrix--Locus of Decision
(N=247)

	Factors					
Item	I	II	III	IV	V	VI
1	-013*	465	192	071	220	-012
2	142	638	067	187	120	218
3	083	540	-066	288	303	151
4	002	316	017	004	105	628
5	061	043	094	149	127	463
6	139	271	086	245	476	163
7	095	199	105	224	823	137
8	187	162	207	413	470	-103
9	109	260	013	443	174	-106
10	077	092	-059	460	169	104
11	056	144	238	517	171	076
12	208	133	235	612	216	030
13	241	121	263	532	225	086
14	995	031	184	286	116	-004
15	673	144	181	209	203	063
16	150	028	701	176	172	112
17	130	222	654	204	124	-121
18	177	-009	475	288	065	175

*Decimals have been omitted

Table 47

Oblique Primary-Factor Structure Matrix--Change in Practice Over Time

	Factors					
Item	I	II	III	IV	V	VI
1	278*	583	293	199	223	243
2	136	897	249	094	255	532
3	135	733	312	156	241	679
4	094	401	221	168	369	593
5	149	236	343	169	538	451
6	297	252	538	378	386	346
7	291	270	588	216	433	052
8	211	342	777	196	305	163
9	256	289	825	175	296	309
10	221	303	668	200	352	444
11	193	225	332	176	532	247
12	177	180	314	185	510	146
13	234	155	169	392	570	166
14	211	213	168	290	690	334
15	995	237	213	431	299	-030
16	813	188	253	582	258	098
17	419	205	282	751	314	137
18	418	169	109	762	417	073

*Decimals have been omitted

Table 48

Oblique Primary[1]-Factor Structure Matrix-- Uniformity of Practice

(N=247)

Item	Factors					
	I	II	III	IV	V	VI
1	603*	159	324	622	488	483
2	603	086	362	560	546	533
3	498	203	379	552	973	562
4	497	201	395	515	846	551
5	363	046	743	319	425	358
6	210	-017	879	217	288	185
7	747	162	220	489	470	657
8	869	012	219	348	332	462
9	583	168	231	439	444	821
10	422	195	165	343	385	670
11	554	153	312	474	493	655
12	479	162	254	472	347	422
13	429	351	172	789	463	429
14	378	364	116	795	420	374
15	398	351	287	662	355	405
16	130	918	-018	412	170	217
17	091	936	-021	359	164	193
18	086	774	061	379	238	234

*Decimals have been omitted

APPENDIX D

ITEM INTERCORRELATION MATRICES FOR EACH OF PARTS I, II, AND III IN THE USE OF THE FINAL FORM OF THE QUESTIONNAIRE

Table 49

Item Intercorrelations for Locus of Decision
(N=247)

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1																		
2	28*																	
3	20	39																
4	14	25	19															
5	04	07	06	31														
6	12	22	29	11	16													
7	19	13	26	14	10	41												
8	21	07	17	-04	10	24	38											
9	13	17	22	01	-03	13	12	30										
10	00	08	18	08	06	16	16	15	23									
11	04	17	14	04	09	16	18	19	22	29								
12	11	10	23	00	13	15	19	29	22	22	33							
13	07	16	15	04	14	20	18	30	23	19	23	45						
14	-01	14	06	-03	09	16	09	24	16	12	10	25	29					
15	05	15	16	08	03	15	20	18	10	10	12	22	21	68				
16	07	05	03	08	06	12	16	18	03	-03	19	15	28	16	19			
17	27	12	04	-03	01	14	09	20	09	01	24	22	17	18	16	44		
18	04	10	-01	04	17	07	09	13	07	13	20	23	18	22	16	40	27	

*Decimals have been omitted

Table 50

Item Intercorrelations for Change in Practice Over Time
(N=247)

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1																		
2	53*																	
3	44	72																
4	24	44	51															
5	20	29	36	39														
6	31	28	33	27	40													
7	29	24	23	20	35	37												
8	29	34	32	24	27	43	55											
9	33	30	38	24	37	52	49	65										
10	32	35	40	34	37	47	38	53	62									
11	16	25	27	35	32	29	34	32	31	35								
12	17	20	20	20	26	24	30	32	29	29	36							
13	22	17	17	22	28	31	22	19	20	21	31	35						
14	20	27	27	32	43	32	26	19	21	32	32	34	44					
15	31	19	17	12	18	33	32	25	29	25	22	20	26	24				
16	23	16	21	20	17	39	27	29	29	30	18	22	30	23	82			
17	26	18	23	22	20	38	30	28	28	31	22	21	35	25	45	52		
18	22	15	17	16	23	32	23	17	16	16	24	20	36	36	45	52	60	

*Decimals have been omitted

Table 51

Item Intercorrelations for Uniformity of Practice
(N=247)

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1																		
2	62*																	
3	44	50																
4	38	47	82															
5	31	32	39	39														
6	21	26	25	28	64													
7	46	43	44	42	27	12												
8	41	42	29	32	25	12	63											
9	37	43	41	39	26	13	57	38										
10	24	30	34	37	21	08	43	27	54									
11	45	47	44	44	32	19	43	39	52	44								
12	34	33	33	32	25	18	35	39	38	24	31							
13	47	39	43	41	20	12	40	23	31	29	31	40						
14	43	35	39	37	16	06	33	22	29	21	31	30	66					
15	38	35	32	32	27	22	32	24	29	26	34	37	49	53				
16	15	08	16	17	03	-04	17	04	15	17	15	14	34	35	34			
17	14	07	15	17	01	-03	13	00	13	16	11	14	30	29	30	86		
18	17	10	24	20	09	03	12	-02	17	17	16	15	28	33	29	70	72	

*Decimals have been omitted